NATIONAL BUREAU OF STANDARDS REPORT

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Report of the VOLUNTARY STANDARDIZATION POLICY STUDY GROUP

U.S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

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This report, prepared by the above committee for the consideration of NBS management, studies NBS activities in the field of voluntary standards and makes recommendations for organizational and policy changes.

U.S. DEPARTMENT OF COMMERCE

NATIONAL BUREAU OF STANDARDS

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Table of Contents

Table of Contents (cont.)

Chapter 1
Introduction

1.1 Background and Purpose

The history of NBS activity in the field of industrial and consumer standards reflects an interest and participation which has varied widely over the years. Except for the early years of the Bureau's history and for a period after World War II, the Bureau's policies concerning industrial and consumer type standards have been ambiguous. In the early years of Bureau history, development of these standards was an important component of the overall Bureau mission; NBS also took an active part in product testing and developmental activities. In the period after WW II, however, research on standards for physical measurements and related scientific knowledge received primary emphasis. Participation in engineering standards committees diminished.

In recent years, NBS participation in standards committees has been increasing as a result of renewed emphasis on more effective use of technology in industry and government. Despite the participation of hundreds of Bureau staff members in well over 1000 committees of private standards making organizations, these individuals have policy guidance from central management only in a broad statement of policy in the NBS Administrative Manual that participation in professional society activities and, by extension, standards committees is encouraged. Furthermore, the increasing public and Congressional concerns with consumer interests, environmental pollution, and product safety have emphasized the need for NBS to develop policies and positions to plan the direction and scope of its participation in engineering standardization activities.

The aim of this study is to explore the issues associated with Bureau policies for participation in private voluntary standardization activities and to provide the basis for the formulation of new policies. The Panel's principal contribution is intended to be clarification of issues and options upon which new NBS policies and positions might be established.

1.2 History

The Bureau's history in engineering standards began as routine testing of products almost solely for the information of government agencies. This became in many instances active programs of product research, necessitating close cooperation with private industry and trade associations.

NBS was one of the principal reorganizers of the predecessor to ANSI, the American Engineering Standards Committee (AESC) in 1918; NBS and the AESC had cooperated together since 1909. The impetus for the reorganization had come about from the wartime interests in standardization to promote mass production. The peacetime thrust of standardization came from the use of standardization to curb inefficiency and waste. In 1920, Herbert Hoover, as president of the Federated American Engineering Societies, initiated a survey* to determine the amount of wastage in time and materials. The study indicated that in six industries, nearly 50% of the costs of production and distribution could be eliminated through standardization and simplification alone. Standardization in general obtained wide support from government and industry. His study of the advantages of standardization set the stage for an active pursuit of developing voluntary standards in cooperation with industry when he became Secretary of Commerce. While Hoover was promoting standardization, the NBS Visiting Committee in 1926 expressed concern that this work was crowding out the work on basic physical standards and research. Partly as a result of increased prosperity consumers wanted more styles and variety, which then became an obstacle to standardization. Furthermore, as industry's confidence grew in the 1920's, there was more reluctance to cooperate with the Department. The growth of AESC and the sharp reduction in appropriations during the early 1930's caused NBS to decrease its standardization activity. In 1933 the American Standards Association (ASA), the successor of AESC, worked out an agreement to absorb the Department's standardization activities in safety and building codes as well as simplification and commercial standards. Strong objections by industry thwarted a move to eliminate the latter activity. NBS cooperation with ASA continued to grow as ASA opened a Washington Office at NBS to facilitate the cooperative work of the two organizations.

*Waste in Industry, (New York, McGraw-Hill, 1921), referenced in Cochrane, Rexmond C., Measures for Progress, A History of the National Bureau of Standards, Washington, D.C.: GPO, 1966, p. 253.

In 1945, a second attempt was made to transfer the Department's development of standards to private organizations. The Wilson Report*, commissioned by the Department of Commerce, advocated the development of all standards through private organizations and urged that NBS limit its activities to (1) basic research and development, and (2) the development of test methods. Secretary of Commerce Wallace responded that "The Department has a statutory responsibility to provide such services (standards development) in the interest of business and industry and the general public, and we have no authority to refuse such requests."

In 1948 NBS relinquished its membership in ASA when ASA acquired a New York charter. Withdrawal from ASA was "based on the doubtful legal grounds of the mixed membership (of ASA) and as being misleading to the public."** In 1958, a National Academy of Sciences committee headed by Dr. M. J. Kelly was established at the request of Secretary Weeks to study the Department of Commerce. The focus of this study was on the progress of the implementation of the recommendations of the 1953 Ad Hoc Committee. With reference to standardization activities this report recommended, "that the Secretary of Commerce take the leadership in initiating another study of standardization in the United States by an appropriately constituted body for the purpose of strengthening and unifying the standards and simplified practices program of the nation."*** In 1963 a Panel on Engineering and Commodity Standards, the so-called LaQue Committee, was convened to review the broad requirements for standards and to make appropriate recommendations. The resulting report urged maximum feasible participation of NBS scientists and engineers in committees of the private standards bodies.****

*Wilson, Charles E., "Report on the Policy Committee on Standards", Industrial Standardization, April 1946.

**Cochrane, Rexmond C., Measures for Progress, A History of the National Bureau of Standards, U. S. Department of Commerce, U. S. Government Printing Office, Washington, D.C., 1966, p. 449.

***Ad Hoc Committee, NAS, "A Report to the Secretary of Commerce," October 15, 1953.

****LaQue, Francis, "Report of the Panel on Engineering and Commodity Standards of the Commerce Technical Advisory Board," Section A, PB 166-811; Section B, PB 166-812, Department of Commerce, Clearinghouse of Federal Scientific and Technical Information, 2/2/65.

1.3 Approach

The factors which must be considered in the development of engineering standardization policies and positions are numerous and their interactions are truly complex.

Among these factors are:

(1) Standards encompass many characteristics: (a) subject matter: (b) types such as nomenclature, dimensional; (c) purposes such as restriction of variety, facilitation of communication and transaction, protection against known hazards; and (d) quality or adequacy to perform its intended purpose. Depending upon specific characteristics standards may have varying effects on the economy, both positive and negative, directly or indirectly.

(2) Standards are developed by a variety of organizations with varying purposes and procedural differences. More than 450 standards organizations, trade associations, professional societies and government agencies are listed in the NBS Directory of Standardization Activities as regarding standardization to be an important part of their work.

(3) Standards can be developed as voluntary standards, but can become mandatory through subsequent incorporation in codes and regulations.

(4) Although the specifications that comprise a standard are often technical, their impacts are primarily economic and the contributions of individual standards are difficult to assess.

(5) In the consumer product area, standards are one way of achieving consumer satisfaction. Other means may be more or less effective.

(6) Many areas of engineering standardization interact closely with the Bureau's other activities while many areas do not.

(7) The generality of the Department of Commerce and Bureau objectives provides many policy and operational options.

There are many kinds of information which were beyond the capability of the Panel to obtain. For example, Bureau personnel are often sought for voluntary standards committee work, not just for their technical competence, but also because of the need for general or user interest representation. Thus, how many and what kinds of standards are not developed because of lack of public interest representation?

What are the utilization characteristics of standards of various kinds, of standards in which Bureau personnel have participated? Where are the needs? What are the criteria to establish need for a standard, how are they to be measured, and what are the sources of information? The lack of information of this sort severely limits the conduct of a truly objective analysis.

The Panel has relied heavily on the experiences and judgments of individuals. The subject of this Study has been at least part of the topic of many previous concerns by individuals and groups, both large and small, formal and informal. The Panel has relied on the records of these prior thoughts, deliberations, and proceedings to a great extent. Among this material are, for internal NBS problems: Progress reports by C. D. Quarforth for his studies of engineering standards as a Commerce Science Fellow in 1965-66, reports emanating from OESL, and notes from meetings attended by various interested parties. For the voluntary standardization system, there are the LaQue Report, Congressional hearings on several standards bills, minutes of the Interagency Committee on Standards Policy, and many published articles.

The Panel met with a number of knowledgeable people at informal meetings. The list of these individuals is included in the Appendix A.

A questionnaire developed by the Panel was sent to all NBS staff members participating in voluntary standards activities. This multipurpose questionnaire sought specific data on such topics as participation costs and recent output of committees, and more general information on individual attitudes and reasons in connection with their relationship to committee activities. This questionnaire was the only source of new data obtained by the Panel.

1.4 Types of Voluntary Standards

Because the contentions and issues raised in the area of voluntary standardization do not apply equally across the entire spectrum of activity, the Panel found it convenient to identify voluntary standards by the following types:

(1) Nonproduct technological standards.
(2) Industrial market product standards.
(3) Retail market product standards.
(4) Obligatory standards.

Type 1 - Nonproduct technological standards include standards of terminology, definitions, symbology, and general tests methods applicable broadly to physical and chemical quantities. These are the standards that facilitate the exchange of information among scientists, engineers, and technologists. While the same subject matter shows up in the other types, the bulk of Type 1 activity occurs in standards not concerned with products.

Type 2 - Industrial market product standards include the following characteristics that apply to products intended primarily for industrial use: dimension, design, configuration, processes, material, performance, safety, compatibility, and interchangeability. Also included are labeling, documentation, classification, grading, test methods, and acceptance levels.

Type 3 - Retail market product standards apply to products that are sold primarily in the retail market place as entities. It may include all of the product characteristics described in Type 2 above, and include additional considerations of quality, durability, and instructions for safe and proper use.

Type 4 - Obligatory standards apply to those prepared voluntarily with reasonable expectation of becoming obligatory (binding in law or conscience; imposing, or of the nature of, duty of obligation). This includes standards relating to public health, safety, and welfare. Also included are acceptable levels of risk, in the personal as well as the economic sense. Examples are statistical methods for determining the accuracy of metering devices, acceptable levels of exposure to radiation, building codes, and fair packaging and labeling.

1.5 Contents of Chapters

The policy needs were partitioned into two categories: (1) those that serve the general relationship between NBS and the voluntary standardization system and (2) those that will serve the management responsibilities within NBS in its participation in voluntary standards committee activities. These two categories provide the principal format of the Report.

Chapter 2 briefly describes the voluntary standardization system in the United States, emphasizing those organizations with which NBS has the most important contacts. In Chapter 3, NBS participation in the voluntary standardization system is described. The description includes the extent and nature of Bureau participation, administrative regulations and policies, roles and functions of Bureau organizational units, participant views of impact of standards activities, and attitudes toward standards activities. Chapter 4 identifies the specific problems, issues, and contentions that are associated with (or levied against) the voluntary standardization system and which may be of concern to the Bureau. The problems and issues related to Bureau participation in engineering standards activities are also identified in this chapter. Chapters 2, 3, and 4 are intended as background material and are essentially descriptive. The remaining chapters provide the analysis and the substantive deliberations of the Panel. The alternative roles and objectives that are open to the Bureau are explored and discussed in Chapter 5 and the Panel's recommendations in this regard are in this chapter. In Chapter 6, the important management problems associated with the roles explored in Chapter 5 are examined and ways in which these problems might be resolved are discussed. Chapter 7 takes up the problems related to international standards and the case of the NBS Voluntary Product Standards is considered in Chapter 8.

Chapter 2
The Existing Voluntary Standardization "System" In the United States

2.1 Classification of Organizations

Voluntary standards affecting the United States are written by a large number of organizations. The Directory of United States Standardization Activities (NBS Misc. Publ. 288, 1967) lists over 400 of these organizations that either write or sponsor voluntary standards. One way of classifying these is the following:

A. Voluntary Standards Writing and Promulgating Bodies. The American Society for Testing and Materials (ASTM), the American National Standards Institute (ANSI) and the Office of Engineering Standards Services (OESS) of the National Bureau of Standards are unique because their activities are exclusively concerned with standards and standardization.

B. Professional Societies such as the Institute of Electrical and Electronic Engineers (IEEE), the Instrument Society of America (ISA), the Society of Automotive Engineers (SAE), the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), and the American Society of Mechanical Engineers (ASME).

C. Trade Associations such as the Aerospace Industries Association of America (AIAA), the American Gear Manufacturers Association (AGMA), the Electronic Industries Association (EIA), and the National Electrical Manufacturers Association (NEMA).

D. "Listing" Bodies such as Underwriters' Laboratories (UL), and Factory Mutual Engineering Corporation (FMEC).

E. Scientific Bodies such as the American Chemical Society (ACS) and The International Union of Pure and Applied Chemistry (IUPAC).

2.1.1 General Description of Writing and Promulgating Bodies

The writing and promulgating bodies (ASTM, ANSI, and OESS) have produced about 33 percent of the voluntary standards that are currently in effect and are writing over a thousand consensus standards annually in a great variety of technical areas. Most of these standards, however, are industrial market product standards including many test methods for specific quantities and materials. Many of the organizations that fall into the other classes

listed above are also active on the technical committees of these bodies as are most of the NBS staff that participate in the standardization process. While ASTM is the most active organization writing standards, ANSI serves as the coordinating organization for the system, promulgating standards submitted to it by other organization as "American National Standards."

2.1.2 General Description of Professional Societies and Scientific Bodies

The primary concern and activity of the professional societies and scientific bodies are toward the advancement of their profession and the engineering and scientific fields. Some of their activities, however, are directed toward standardization which generally results in standards of the technical non-product type. In their common concern with the exchange of information many of these activities tend to be in the areas of definitions, terminology, and symbolic representation. In addition, the professional societies are interested in test methods of general application. The professional societies have produced about 32 percent of the voluntary standards that are currently in effect and are writing over 500 new standards annually. Many members of the NBS staff are involved in these activities of the professional societies and the scientific bodies.

2.1.3 General Description of Trade Associations

The primary concern of the trade associations is the protection and profitable advancement of their products. As a result, the standardization activities of this class of organization are overwhelmingly directed toward their products both in the industrial and retail markets. Some of the standards written by these associations also end up as obligatory standards even though they may not have been developed on a "consensus" basis. The trade associations have produced about 30 percent of the voluntary standards that are currently in effect and are writing over 300 new standards annually. Very few members of the NBS staff participate in these activities of the trade associations.

2.1.4 General Description of Listing Bodies

The primary concerns of listing bodies are the property and production loss prevention engineering service to industry and the public, and operation of laboratories for the investigation of materials, devices, products,

equipment, construction, methods, and systems with respect to hazards affecting life and property. Items meeting the performance standards set by the engineering staff of these organizations to meet these objectives are listed by them and may be marked by the manufacturer with a special symbol to indicate that they are so approved. Standards are developed by the listing bodies to form the basis for their investigations and listing services. NBS and other independent laboratories are sometimes asked to perform referee tests to settle a dispute between a listing body and a manufacturer. A few members of the NBS staff participate in the standardization activities of the listing bodies. Only about 3 percent of the voluntary standards that are currently in effect have been developed by the listing bodies but many of these standards end up as obligatory standards.

2.2 General Description of the Standardization Process

Characteristic of voluntary standards is the fact that participation in the "system" is voluntary; i.e., the choice of what to standardize is voluntary, the representation on the technical group writing the standard is voluntary, and the use of the standard is usually voluntary.

Perhaps because of this voluntary approach the process of developing a standard has not been standardized. Generalizations of the process, however, can be made. The suggestion or impetus for developing a standard may come from a variety of sources including members and nonmembers of the cognizant committee or organization. The decision to develop a standard and the assignment of the activity to a technical group is usually made by a policy board or committee of the standards writing organization. The draft of the standard is made by a technical group which may carry the designation of technical committee, subcommittee, task group, project committee or ad hoc committee. After the draft has been prepared there is usually both a technical and procedural review by the policy board of committee that assigned the work and higher policy groups or the general membership of the organization. At each review level the draft can be resubmitted to the technical group to comment or redraft.

2.3 Description and Procedures of Some Organizations

It was deemed worthwhile for the purpose of this study to provide a brief description and to indicate the procedures of a few of the major standardizing organizations including at least one example from each of the five

classes. It should be clearly understood, however, that the descriptions and procedures given below for these organizations are only applicable at the time of this writing; i.e., many of these organizations are reviewing and changing their procedures so that steps now followed may not be the steps followed when this report is read.

A detailed description of the Voluntary Product Standards program operated by the National Bureau of Standards is given in Chapter 8 and will not be repeated in this section.

2.3.1 American National Standards Institute (ANSI) (Domestic Standards Only)

One of the aims of ANSI is to serve as a national standards promulgating institution where voluntary standards developed by other organizations may be approved as American National Standards after the Institute determines that they are supported by a national consensus.

The Institute also provides the machinery for developing standards in accordance with its procedures which requires agreement among interested and affected parties.

The Institute is also trying to start a certification program in which retail market products will be tested by independent laboratories to determine conformance with standards that define physical qualities and performance characteristics.

Financial support of the Institute comes from the dues paid by members and from the sale of published standards. According to ANSI's 1969 Annual Report this support amounted to:

Members	$ 915,000
Sales	900,000
	$1,815,000

ANSI has three types of membership: (1) Member Body - a nonprofit technical, professional, scientific, trade, or other organization of national scope and recognition, including departments or agencies of federal or state governments, interstate and regional authorities; (2) Company Member - a corporation, company, partnership, or other organization engaged in commercial,

educational, professional, research, or testing enterprise; (3) Sustaining Member - an individual or corporation interested in standards. According to the 1968 list of members there were 143 Member Bodies of which over 50 percent were trade associations; there were 781 Company Members of which 14 percent were insurance companies, 35 percent were natural gas and electric public utilities, and 50 percent were industrial firms; and there were 6 Sustaining Members, all of which were individuals.

The major involvement of the membership in and contributions to the activities of the Institute are made through the various Councils and Boards. There are three Councils: (1) Member Body Council - reviews standardization and approval procedures, approves standards as American National Standards, evaluates needs for new standards, and promotes the initiation of new standards projects; (2) Company Member Council - promotes understanding between industry and the Institute, membership and financial support, and the certification program; (3) Consumer Council - evaluates areas where standardization can generate improvements in consumer goods, services, and environment, promotes understanding between the general public and industry in matters concerning standards affecting the public, and the certification program in the consumer areas.

There are three types of Boards: (1) The Executive Standards Board - to coordinate standardization activities and insure compliance with operating procedures, to establish Technical Advisory Boards, coordinate their scopes, and assign standardization projects for action. (2) Technical Advisory Boards of which there are presently 17: Acoustical, Construction, Electrical and Electronics, Graphic, Heating, Air-Conditioning and Refrigeration, Highway Traffic Safety, Information Processing Systems, Materials and Testing, Mechanical, Mining, Miscellaneous, Nuclear, Photographic, Physical Distribution, Piping and Process Equipment, Safety, Textiles. Their membership is made up of organizations (technical societies, trade associations, government groups, research and testing laboratories) and individuals having concern and competence in the scope and functions of the Board, with Consumer and Company Member liaison. These Technical Advisory Boards assign the

development of standards to organizations or to ANSI Committees, approve the scope, personnel, balance, and secretariat of ANSI Committees, review proposed standards, and coordinate participation in international standards projects. (3) Board of Standards Review - to conduct a judicial review of proposed standards in order to determine if the views of all interested parties have been given full consideration, if ANSI requirements have been met, and if a consensus has been reached. The members of this board are appointed by the ANSI president in consultation with chairmen of the Institute Councils on the basis of individual competence and the ability to render an impartial judgment. The Director of the National Bureau of Standards is a member of the Board of Directors of ANSI, a staff member is on the Consumer Council, and other staff members are on 8 of the 17 Technical Advisory Boards.

ANSI uses two methods for the development and approval of American National Standards: (1) Canvass Method - the consideration of an existing standard written by a responsible body, by a canvass or mail poll of organizations known to have interest and competence: the sponsor of the standard to prepare the canvass list, and the appropriate Technical Advisory Board to review it, the sponsor to conduct the canvass and submit it to the ANSI Board of Standards Review which determines that appropriate procedures have been followed, that views of all interested parties have been considered, and that a consensus has been reached. (2) Committee Methods - the scope, membership, balance, secretariat, and progress of the committee being reviewed by an appropriate Technical Advisory Board, which also reviews the proposed standard and the resolution of negative votes in the committee; the Board of Standards Review determines that proper procedures have been followed, and that a consensus has been reached.

Committee makeup is as follows: A Product Standard committee should include representatives of producers, distributors, and consumers; a Safety Standard committee may include manufacturers, employers, employees, regulatory bodies, insurance representatives, installers, utilities, distributors, and experts.

Not more than 1/3 of the membership gmay be from any one category, and public interest must be adequately represented. The phrase "public interest", as used by ANSI and practically all other standardizing bodies, only means that they strive to control any undue commercial interest that restricts competition or innovation to gain parochial advantages.

2.3.2 American Society for Testing and Materials (ASTM)

This is a national nonprofit, technical, scientific, and educational society of over 13,000 members, founded in 1898 and formally incorporated in 1902 for the purpose of "the promotion of knowledge of the materials of engineering, and the standardization of specifications and the methods of testing."

As of the end of 1969, 4170 standard specifications, methods of tests, and definitions were in effect and hundreds of research projects were under way. Of the 13,000 regular members of the Society, about 2600 are corporate memberships and the balance are individual members of Federal, state, and municipal departments; universities and technical schools; or technical societies and libraries. Not included in this field are upward of 1100 student members at leading technical schools. About 15 percent of the membership is from outside of the United States. In addition to members of the Society, there are about 8100 other individuals who are active in the Society's committee work, representing various companies which are members of the Society. Thus, all told, there are over 22,000 members, committee members, and students.

The Society, one of the five originators of ANSI, is the sole or joint sponsor of many ANSI projects and more than a half of the standards approved by ANSI were developed and published by the Society. A great many of the Society's standards are used in textbooks and reference publications. Especially notable has been the widespread use of ASTM standards in various building codes such as those recommended by the Building Officials Conference of America, Inc., Southern Building Congress, American Insurance Association,

International Building Officials Conference, the codes issued by New York City, Chicago, Boston, and others. The Materials Section of the Boiler Code Committee of the American Society of Mechanical Engineers is based on ASTM specifications. Numerous divisions of the Federal Government cooperate closely with the Society and its technical committees. A member of the NBS staff is on the Board of Directors and at least 4 other staff members serve on policy forming committees.

Membership on technical committees may be either as individual or organizational members. An organizational member is a company, corporation, university, society, or federal or state agency. All Society members may apply for membership on those technical committees that are active in their area of interest. Election to membership on a committee, however, is not automatic since the applicant can be refused because (1) he is not technically qualifed or (2) his election would upset the producer-nonproducer balance.

A technical committee may be one of four kinds--a materials committee, a test method committee, a product committee, or a material-attribute committee. On technical committees dealing with materials or commodities having commercial bearing, the number of producer members shall not exceed the combined total of consumer and general interest members. The chairman of these committees cannot be classified as a producer. Technical committees are established on authorization of the Board of Directors, acting on a recommendation of the Committee on Standards, the Committee on Technical Committee Operations, a conference, or on its own initiative. Subcommittees have no standing in the Society except through their parent committees and may therefore have consulting members who may be allowed to vote even though they are not members of the Society.

Society members can be elected to the Board of Directors for three-year terms. Management of the Society is centered in the Board. Society policy is executed by a full-time managing director and his staff. The Committee on Standards is responsible for all phases of the standardization work of the Society including the review of recommended standards. The Committee on Technical Committee Operations is responsible for the regulations governing the technical committees and for means of achieving their most efficient operation. The Committee on Consumer Standards attempts to stimulate,

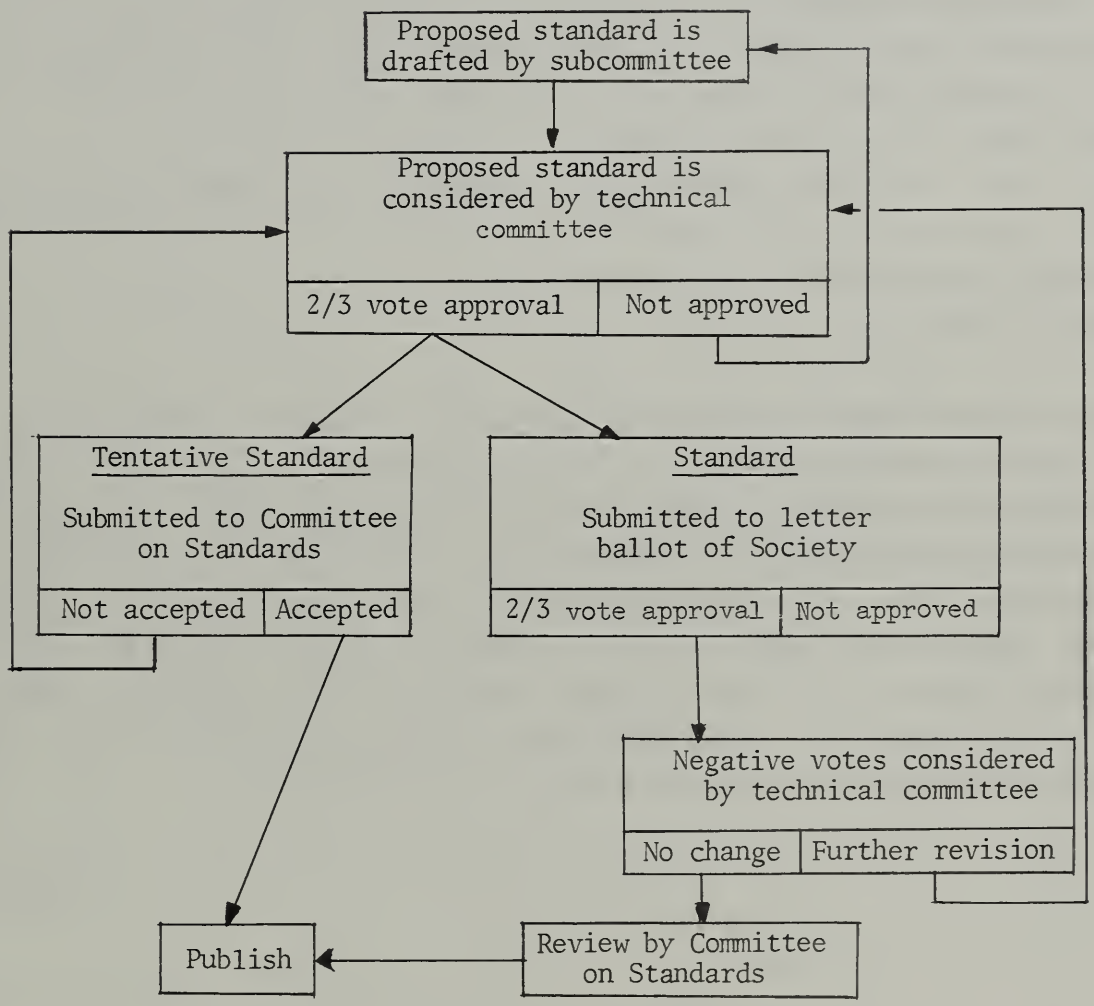
coordinate, and develop methods of test or recommended practices for measuring the performance characteristics of products and services for personal use by the ultimate consumer. ASTM has also established special committees on Numerical Reference Data, Materials Inspection and Testing Laboratories, and Metric Practice.

As defined by ASTM, a "Standard" is a specification, method of test, classification or definition that has been approved by the sponsoring committee and adopted by the Society. A "Tentative Standard" is a standard that has been adopted for publication and use preliminary to adoption as Standard, thus providing opportunity for comment. A "Recommended Practice" is a procedure or guide that may be auxiliary to a standard specification but does not have to be.

It is the general policy of ASTM to prepare new Standards rather than new Tentative Standards; even so, when Standards are revised completely and rewritten, they may revert to tentative status. Tentative Standards are reviewed each year by the technical committee and after three years must either be adopted as Standard or withdrawn. Standards must be reviewed every 5 years and either reapproved or revised.

A suggestion to prepare a new standard originates in or is recommended to a technical committee and is referred to one of its subcommittees for preparation. Once a draft has been prepared it is recommended to the parent committee by letter ballot amounting to 2/3 of those voting. At all stages within ASTM negative votes carry considerable weight. Reasons for a negative vote must be stated and discussed by the members and an attempt made to resolve the differences. Committee recommendations are normally agreed upon at regular meetings as a result of 2/3 of those voting, subject to confirmation by letter ballot. In a "classified" committee an affirmative vote consists of 2/3 of the combined number of consumers and general interests voting and 2/3 of the producers voting. The total of the ballot returned must be not less than 60% of the membership of the committee. Acceptance of recommendations is either by actions of the Society in Annual Meeting or by the Committee on Standards. In Annual Meeting an affirmative vote amounts to 2/3 of all Society members voting. Between Annual Meetings the Committee on Standards acts on behalf of the Society by determining whether the requirements of the Society relating to committee procedure have been met and whether the committee has reached a satisfactory consensus.

Outline of Standardization Procedure
Used by ASTM



IEEE recognizes the need for a strong interest and activity in electrical standards and takes a prominent and leading part in these activities. Standardization activities are in the area of basic technical subjects such as definitions, terminology, symbolism, data presentation, methods of measurement, performance requirements, and safety. The Institute also maintains liaison with and continually reviews the standardization work of international organizations such as CCIR, CCITT, URSI, ISO, CEE, COPANT, and especially the IEC.

The IEEE Standards Committee is responsible for encouraging and coordinating the formulation and revision of IEEE Standards and gives final approval to them before publication. This committee also represents the IEEE in cooperation with other standardizing bodies in matters relating to units and standards. The Standards Coordinating Committees are appointed by the Standards Committee to direct and review the work of the Technical Committees. Staff members of the National Bureau of Standards serve on two policy forming committees of IEEE.

Proposed standards may be prepared by an IEEE Technical Committee or they may be submitted by outside bodies to IEEE for approval. When submitted by an outside body the proposal is referred to a Technical Committee for comment. When the sponsoring body has approved the proposal and any substantial objections have been resolved it is submitted to the Standards Committee for approval. After consideration of any negative vote or adverse comment and an affirmative vote by 3/4 of the voting members of the Standards Committee the proposal is printed as an IEEE Standard. If the proposal is not approved the sponsoring body may modify it to satisfy the objections.

When an IEEE Standard is of sufficient scope or importance to the industry, it may be submitted by the Standards Committee to ANSI for consideration as an American National Standard.

2.3.4 Electronic Industries Association (EIA)

Membership on the standardization committees of this trade association is open to all technical personnel having a legitimate interest. Each member can vote but he is considered as acting for his employer. All committees of the Association maintain liaison with related groups in other standardizing bodies such as IEEE, ANSI, ASTM, and NEMA.

There are approximately 240 standards currently available, covering all types of components, communications equipment and systems, electron tubes and semiconductor devices, sound equipment, wires, cables, and transmission lines, preferred numbers and colors for coding, modular dimensions, racks and panels, etc. Recently work has also been initiated in the areas of integrated circuits and microelectronics. In addition, a variety of test charts have been standardized and made available for checking resolution, linearity, and registration of television and facsimile systems.

The Association also sponsors the Electron Tube Council of the Joint Electron Device Engineering Council (JEDEC), and cosponsors with the National Electrical Manufacturers Association (NEMA), the Semiconductor Device Council of JEDEC. The EIA Engineering Office also administers the JEDEC type designation system which makes possible the interchangeability of electron tubes and semiconductors from many sources of manufacture.

During the development of an EIA standard, minutes of all meetings must be taken including a statement of all matters discussed and action taken. Appropriate reasons for such action and a record of the vote must also be noted. Any EIA committee may propose a standard but the Director of the Engineering Department of EIA together with approval of Legal Counsel determines the need for the standard. Staff members of the Engineering Department prepare a draft of the Standard which is circulated to all member companies for comment. All comments are reviewed by the sponsoring committee. All adverse comment must be considered and attempts made to resolve them. If changes are made, the draft is recirculated. Unanimous opinion is not necessary for approval, but rather the assurance of overwhelming consensus of "all" parties of interest. Approval of the draft by the General Standards Committee acting in a judicial capacity only (without regard to technical matters) results in an EIA Standard.

2.3.5 Underwriters' Laboratories (UL)

This organization was established to maintain and operate laboratories for the examination and testing of devices, systems, and materials with respect to fire safety. Founded in 1894, the enterprise is sponsored by the American Insurance Association, and is chartered as a nonprofit corporation.

Of equal importance with the examination and testwork of Underwriters' Laboratories is its inspection and follow-up program in the factories where listed devices are manufactured.

The objectives of Underwriters' Laboratories are to conduct investigations, studies, and tests to determine the relation of various materials, devices, constructions, and methods to life, fire, and casualty hazards, and to ascertain, define, and publish standards, classifications, and specifications for materials, devices, constructions, and methods affecting such hazards, and other information tending to reduce and prevent loss of life and property from fire, crime and casualty.

The majority of underwriters in the United States, and many Federal, state, and municipal authorities, plant operators, architects, building owners and users either accept or require listing by Underwriters' Laboratories as a condition of their recognition of devices, systems, and materials having a bearing upon life and fire hazards, and upon theft and accident prevention.

UL has issued more than 250 standards and sets of requirements for construction and performance of systems, materials, and appliances submitted to them. They are published so that others may know the basis for Laboratories' opinions and the standards must necessarily justify the opinions. Many of the Laboratories' Standards bear ANSI approval.

In its work in standardization, the Underwriters' Laboratories cooperates with many organizations including ANSI and National Fire Protection Association. It is also officially represented on many ANSI sectional committees. The Underwriters' Laboratories also cooperates with the American Society for Testing and Materials through representation on technical committees dealing with the development of standards and methods of test.

Although UL is financed by the manufacturers of the products that are listed by UL, it has apparently maintained a relative degree of freedom from the commercial interest of the manufacturers. UL must be conscious of the "economic realities", however, and not set safety levels so high that manufacturers will not use them.

Four Engineering Councils covering the major areas of interest to UL, Burglary Protection, Casualty, Electrical and Fire Protection, assist in the development of UL Standards. Members of these councils are appointed by UL from authorities in the field of public safety and government agencies.

The publication of a Standard becomes advisable when more than one manufacturer seeks and obtains listing for a similar product. UL engineers draw up proposed requirements that will be general enough to allow for individual differences in design and manufacture, without sacrificing in the area of safety. These requirements are discussed first with engineers in the appropriate UL department, and then with an ad hoc Technical Advisory Panel and/or Industry Advisory Conference.

Drafts of the proposed Standard are then circulated to all manufacturers listed by UL for the product covered and to the appropriate Engineering Counsil. In addition, if the Standard covers a product used by individual consumers, the draft is circulated to the Consumer Advisory Council of UL. If the Standard deals with a product utilized by industrial or commercial groups, the draft is sent to the appropriate Industrial and Commercial Equipment Users Conference. With the receipt of comments and suggestions from all these sources, the Laboratories makes such modifications or revisions in the proposed Standard as appear to be desirable. With the approval of the revised draft by these groups, the Standard is ready for publication.

2.3.6 American Chemical Society (ACS)

The standardizing activities of this scientific body are carried out by committees appointed by the Council of the Society which is made up of elected officials of the Society. These committees are active in such fields as nomenclature, environmental improvement, clinical chemistry, chemical safety, and analytical reagents. New standards or revisions of current standards that are recommended by these committees are submitted to the Council for approval. The Society also cooperates with other standardizing organizations, especially with the International Union of Pure and Applied Chemistry, whenever it seems desirable to the Council.

2.4 Measure of the Voluntary Standardization System

Knowledge of the size, cost, and impact of U.S. voluntary standardization would be desirable to have but reliable and meaningful statistics are not available for the total system. This is true because of the large number of organizations claiming to be active in standardization and the pervasive

nature of standards themselves. While it is possible to obtain some facts on a few specialized areas such as concrete and plastics, it is extremely risky to generalize to the whole system.

Some data that would be informative to have but are not readily available are:

(1) Total number of active committees (broken down into organizations and technical fields) ~ 2000*

(2) Total number of committee members (broken down into organizations, technical fields, and employers) ~ 60,000*, assuming 30 members per committee.

(3) Total number of current standards (categorized into technical areas) ~ 19,000*

(4) Number of new and revised standards approved each year (categorized into organizations and fields) ~ 2300 in 1968*

(5) Yearly cost of committee members (broken down into organizations and fields) ~ $100,000,000*, assuming $2000 per committee member per year.

(6) Yearly cost of committee members (broken down into areas of industrial support) ~ $100,000,000*, based on extrapolation from ANSI annual budget.

(7) Measure of the impact of standards (number of times standards is used, what it would cost if the standard was not available, etc.) †

The fact is that few facts are known about standards and standardization and even less is known about the impact of standardization. For instance, general information on standards committees is not readily available except for those of ASTM, ANSI, and a few other organizations. There are 111 major ASTM standards committees ranging in size from 8 members on Committee E8 on Nomenclature and Definitions to 413 members in Committee D13, Textile

*Estimation based on Table 2.1 and 2.2

†Study made by the Electronic Technology Division on the development of one standard gave a benefit-cost ratio of 100 to 1.

Materials. These data do not include additional persons who are consulting members and/or members of subcommittees. The size of ANSI committees ranges from 15 to 25 members. Since the development of standards by most other societies and associations is incidental to their principal activities, information on the number and size of their committees is not so readily available. Data is especially not available in the cases where standards are drafted by one organization and submitted to another for promulgation. The following tables provide some information on the total number of standards and the number of standards approved each year. These data also reflect the relative importance of standards bodies but also add to the general confusion. Over the years ASTM has been the most active producer and publisher of standards followed by ANSI, the Society for Automotive Engineers, the Aerospace Industries Association of America, and the American Railroad Association. Many of ANSI's standards, of course, are originally developed by other organizations.

While only a small fraction of the total number of current standards are of benefit to individual consumers and their communities (most of the benefits are indirect), the activity of the standardization system directed toward the development of consumer standards is practically nil. One reason for this situation is the low level of interest in developing consumer standards on the part of the standardizing organizations, and is reflected in almost complete lack of appropriate committees, of effective consumer representation on existing committees, and of consumer advocates in the policy making apparatus of the standardizing organizations.

Table 2.1 Voluntary Engineering Standards Produced* Annually by Major Standardizing Bodies

	1960	1961	1962	1963	1964	1965	1966	1967	1968
ASTM†	160	284	172	296	501	680	662	880	1025
SAE	101	64	83	131	123	173	235	228	470
ANSI	2	83	100	105	140	151	142	111	81
AIAA	27	102	68	99	119	49	73	83	123
AAR	56	27	47	16	66	67	83	23	72
UL	6	20	14	15	25	28	30	31	34
FMEC	10	19	18	13	17	15	25	53	29
NEMA	22	16	17	40	29	18	15	20	16
TAPPI	24	17	0	23	18	14	20	19	33
NFPA	5	20	8	10	20	24	26	46	2
ASME	2	11	2	1	19	167**	25	1	50
EIA	2	14	13	19	13	31	12	21	17
API	4	4	10	9	13	16	16	19	24
ASAE	1	5	1	3	5	14	29	26	28
USDOC	19	13	4	29	21	13	9	1	1
IEEE	13	9	32	16	8	12	11	4	4
AOCS	22	9	2	4	62	8	0	0	0
AASHO	13	5	7	11	18	25	0	0	0
AGMA	1	1	1	10	19	24	17	3	3
MCA	16	11	7	5	5	5	5	5	6
	452	734	606	855	1241	1534	1435	1574	2019

* Includes those standards that have been revised.

**Includes the reissue of the Boiler and Pressure Vessel Code.

† See next page for full names of the organizations.

Information in this table was obtained by the Information Section of the Office of Engineering Standards Services.

Acronym	
ASTM	American Society for Testing and Materials
SAE	Society of Automotive Engineers
ANSI	American National Standards Institute
AIAA	Aerospace Industries Association of America, published as National Aerospace Standards
AAR	Association of American Railroads
UL	Underwriters' Laboratories
FMEC	Factory Mutual Engineering Corporation
NEMA	National Electrical Manufacturers Association
TAPPI	Technical Association of the Pulp and Paper Industry
NFPA	National Fire Protection Association
ASME	American Society of Mechanical Engineers
EIA	Electronic Industries Association
API	American Petroleum Institute
ASAE	American Society of Agricultural Engineers
USDOC	Office of Engineering Standards Services, NBS, U.S. Department of Commerce
IEEE	Institute of Electrical and Electronics Engineers
AOCS	American Oil Chemists Society
AASHO	American Association of State Highway Officials
AGMA	American Gear Manufacturers Association
MCA	Manufacturing Chemists Association

Table 2.2 Total Number of Current Standards and Standards Submitted to ANSI as of December 1969

	Total Number of Current Standards	Total Number of Standards Submitted to ANSI	Number of Standards submitted to ANSI in 1969
ASTM (365)*	4,170	1,850	776
SAE (38)	2,300	4	3
ANSI (336)	1,410**		
AIAA	1,050		
AAR	1,160		
UL (1)	250	59	26
FMEC	330		
NEMA	230	6	
TAPPI (9)	270		
NFPA (7)	200	25	15
ASME (18)	240		
EIA (3)	240	51	6
API (2)	140	2	2
ASAE	110		
USDOC	450		
IEEE (112)***	220	25	4
AOCS	290		
AASHO	330		
AGMA (4)	100	5	
MCA	140		
(895)	13,630	2,027	832
Other (163)	4,570†		
Total (1058)	18,200		

*Number of committees with NBS personnel.

**Number produced by ANSI committees only. Total number of current American National Standards is 3480.

***Not all of these committees are engaged in standardization.

†Some 337 other bodies produce anywhere from 1 to 99 standards each.

2.5 Balanced Representation and Consensus

"Balanced representation" and "Consensus" are terms commonly used in describing the work of the various bodies, but the words mean different things in each situation. For instance, ANSI proceedings for a product standard require committee representation from producers, distributors, consumers, and the public interest with not more than 1/3 of the membership being producers. In this context, "consumer" is a purchaser of the product, not necessarily the customer in the retail market. An ASTM product committee is supposed to be composed of producer, consumer, and general interest representatives; the producer representation is to be less than half the total membership and the committee chairman must not represent a producer. General interest representatives comprise independent authorities who have expert knowledge of the materials to be studied, but who are not concerned directly with their production or use.

The procedures of OESS require that a standard be supported by at least 70 percent of those responding to the distribution of the recommended standard in the production segment, in the distributor segment, and in the user or consumer segment of the industry. Furthermore, it is required that the average proportion of approvals of the three segments be not less than 75 percent.

This highly condensed description of three uses of "balanced representation" describes three methods followed in an attempt to give equitable treatment to all affected parties. Typically, trade associations have no "balance" requirements and only member companies vote on their standards, contending that the resulting standards are intended for use only within their industry. In the same way "consensus" is used to mean different things, but it usually means that it takes something more than a majority to rule. The "consensus" usually is required only from those participating in the preparation, although in the case of Voluntary Product Standards, a consensus is also required from those who review the draft standard. VPS also requires that there be no substantive objections to a recommended standard which are deemed to be valid.

2.6 Certification

A certification of compliance by producers is essential to the acceptance and observance of certain types of voluntary industrial standards and provides guidance and protection to the buyer. The value of a certification depends upon the quality of the standard for the product, the integrity and independence of those who certify the product, and the extent of the testing and inspection required to assure compliance with the standard.

Underwriters' Laboratories operates a certification program through its listing and inspection activities enforcing compliance with its standards by threatening to deny the use of their label. UL's 500 inspectors cover more than 5,000 different categories of products produced in 800,000 models by 15,000 different manufacturers.

As indicated previously, ANSI is trying to start a certification program in which products will be tested by an independent third party. Under a licensing contract, manufacturers will be entitled to use the ANSI mark for products which conform to American National Standards. Unfortunately, the laboratories that will perform the tests, the "independent third party", are selected by the manufacturers or trade associations which request and pay for the certification. A saving grace may be that ANSI must approve the selection. These laboratories will also provide evidence that the manufacturer is maintaining adequate quality control. ANSI has also expressed interest in supporting international accord on certification programs and has requested ISO to plan a meeting on the subject this Fall.

Self certification will work for type 2 standards where the buyer has the facilities to perform inspection tests of the product. Under these conditions the manufacturer usually scrupulously observes the requirements of the standards. Moreover, the test methods that both the producer and the buyer use are well standardized and in many instances their equipment can be calibrated with Standard Reference Materials.* Self certification of retail products to type 3 standards, however, has generally been found in practice to be unsuccessful. At least one exception occurs, however, in the NEMA certification of the BTU rating of room air conditioners. Every company submits a statement of certification but if a model of one of these companies is suspected of not complying, the competitors can accuse them of cheating. A sample is then bought on the open market and tested. If this sample doesn't meet the

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* Made available at cost by NBS.

specifications, the offending company pays for the test and loses the NEMA label; if it meets the specifications, the accuser pays.

To promote voluntary compliance with standards, manufacturers frequently employ certifications, seals, or endorsements (Good Housekeeping for instance), which affirm that a product conforms to prescribed standards. When a manufacturer is self-certifying, however, his assurance is less likely to merit reliance than when the seal represents the verdict of a responsible independent body. Self-certification too often is merely self-serving. At worst, certification may be employed primarily to gain the consumer's confidence rather than to assure compliance with high quality standards.

Chapter 3
NBS Participation in Voluntary Standardization

An estimate of the total cost of NBS participation in voluntary standardization activities is $2 million in FY 70. In round numbers, 350 members of the technical staff hold 950 standardization committee memberships. The sources of these estimates are explained further in Sections 3.2 and 3.3 below, and in Appendix C. A primary breakdown of the estimated costs is:

Office of Product Standards (Commerce)	$ 100 K
Office of Engineering Standards Liaison	135 K
Office of Engineering Standards Services	375 K
Committee service by technical staff	1310 K
Total	$ 1920 K

This chapter provides a summary description of certain aspects of NBS standardization activities. It is intended to lay some basis for assessing the possible impact (within NBS) of policy changes, and for judging the effect of possible new approaches to managing, coordinating, or reviewing the Bureau's standardization activities as a whole.

Only meager information about the Bureau's involvements with committees of private standardization bodies has been systematically maintained at the Bureau level; standardization has not been a centralized category for "management" purposes.

NBS standardization activities are described here under the following headings:

(1) Administrative regulations and policies
(2) Functions of major organizational units and summary cost data
(3) Individual participants: level of activity, roles, motivation and rewards
(4) Impact and benefits: the participants' views

Sources of information are listed as references at the end of the chapter and are cited by number. In addition, the Panel conducted a survey of NBS committee participants. Summaries of the survey findings, in round numbers, are included under the appropriate headings.

A report of the survey and a copy of the questionnaire are given in Appendix C, including information about the reliability of the results. Questionnaires were completed for nearly 850 standardization committee memberships by

about 300 people. Approximately 85% of the people on the Panel's "mailing list" of standardization committee members returned at least one questionnaire (see Appendix C).

3.1 Administrative Regulations and Policies

The authority to participate in private voluntary standardization activities arises from the Organic Act (15 U.S.C. 271) which specifically authorizes:

> "Cooperation with other governmental agencies and with private organizations in the establishment of standard practices, incorporated in codes and specifications."

Work on development of standards is, of course, authorized specifically or implicitly in other sections of the act.

This statutory authority is elaborated in Department Order 90-A (U.S. Department of Commerce, October 1, 1968) that prescribes among the functions of the NBS.

> "d. Cooperate with and assist industry, business, consumers, and governmental organizations in the establishment, technical review, determination of acceptability, and publication of voluntary standards, recommended specifications, standard practices, and model codes and ordinances."
>
> "h. Conduct programs, in cooperation with United States business groups and organizations, for the development of international standards of practice."

The assignment of these functions to organizational units within the NBS is given in Department Order 30-2B (December 11, 1968, amended March 11, 1969), and in Chapter 9 of the NBS Administrative Manual.

NBS policy governing cooperation with standardization bodies is stated in Chapter 3.02 (Professional Committees) of the Administrative Manual.

Administrative Manual Chapter 3.02 (April 30, 1968) describes three types of committee appointments that are recognized: (a) Official spokesman of NBS or Commerce, (b) Technical representative of NBS or Commerce, (c) Individual participant (including representative of an organization other than NBS).

USASI, ASTM, and ISO committees are specifically included under (b). Committee assignments of this type are to be made at the Institute level.* Some participation in voluntary standardization work is reported under committee type (c).

Question 6 of the Panel's survey was "Whom do you represent on the committee?" Replies covering 840 committee memberships were:

250 - Yourself
465 - NBS
20 - Commerce Department or U.S. Government
20 - A professional society
65 - Other
20 - No answer

The survey question did not refer to the Administrative Manual. Moreover, the Panel has the impression that the three types of committee assignments are not clearly understood or consistently interpreted by all NBS staff members. Many of the NBS staff are individual dues-paying members of ASTM. More than one survey respondent wrote a marginal note to the effect that his membership signified his personal professional obligation and commitment.

Responses to Question 6 by members of international standards committees and members of "standards policy" committees, subtotals of the above summary are of particular interest. Only 16 of 69 international standards committee memberships were reported as "NBS representative." Delegates to IEC meetings, in particular, frequently consider that they represent the U.S. National Committee. Among 70 committees classified as standards policy groups, 16 members consider that they represent themselves and 36 state they are NBS representatives.

* NBS is organized into three Institutes and one Center: Institute for Basic Standards, Institute for Materials research, Institute for Applied Technology, and Center for Computer Sciences and Technology (Center for Radiation Research is now part of IBS).

3.2 Functions of Major Organizational Units and Summary Cost Data

The first three parts of this section cover briefly the activities of three offices that have some aspect of standardization as their principal assignment. These are the Office of Product Standards, the Office of Engineering Standards Liaison (OESL), and the Office of Engineering Standards Services (OESS).

The fourth and largest part of this section covers the voluntary standardization activities of the NBS Institutes and Centers.

3.2.1 Office of Product Standards (Commerce)

Reporting to the Assistant Secretary for Science and Technology, and directed by a Deputy Assistant Secretary, this office provides staff assistance to the Assistant Secretary in connection with (1) standards matters that are statutory duties of the Secretary -- e.g., fair packaging and labeling; (2) procedural regulations for voluntary product standards or mandatory standards; (3) policies dealing with standards activities; and (4) coordination with other agencies and nongovernmental organizations. The present name and functions of the office were established by Department Order 16 (July 25, 1969).

This office is expected "... to identify and analyze interrelated technical, economic, social, and legal factors bearing on standards policies or other matters at issue" (D.O. 16). It provides the secretariat, and currently the chairmanship, of the Interagency Committee on Standards Policy.

Department Order 16 charges the Assistant Secretary to insure coordination of product standards activities with the Assistant Secretary for Domestic and International Business, and directs the Office of Product Standards to obtain the views of the Business and Defense Services Administration and others in addition to those of the NBS.

The Office of Product Standards staff consists at present of two men. A rough estimate of the total annual cost of this office (supported by NBS) is $100 K.

3.2.2 Office of Engineering Standards Liaison

The OESL "provides liaison between NBS and engineering standards bodies, both domestic and international; evaluates effectiveness of NBS engineering standards activities; and develops recommendations for engineering

standards policy and legislation" (D.O. 30-2B, December 11, 1968). The office reports to the NBS Deputy Director, who gives "particular attention to technological measurements and standards" (Administrative Manual, Chapter 9.02.10, May 19, 1969).

Activities of the OESL have included (1) provision of staff assistance to the Office of Product Standards, (2) administration of funds allocated to support international travel to attend meetings of international standards committees and organizations, (3) maintenance of a file of standards committee assignments, and (4) staff assistance to NBS management at all levels in connection with requests for NBS participation in private voluntary standards work.

Mainly because of travel ceilings, international travel funds allocations have been decreasing (from $24.2 K in FY 1967 to $15.0 K in FY 1970). The effect of this sharp decline in support for international standards work is shown in Table 3.1, by major organizational units of NBS.

Table 3.1 Expenditures for International Standards Travel

	FY 67	FY 68	FY 69	FY 70
Director's Office (Dir. Off.)	$ 5,123	$ 3,659	$ 1,649	$ 1,695
Inst. for Basic Standards (IBS)	9,362	7,373	5,784	3,981
Inst. for Materials Research (IMR)	4,048	1,002	1,471	2,214
Inst. for Applied Technology (IAT)	4,224	5,867	8,029	3,193
Center for Radiation Research (CRR)	--	1,687	1,100	--
Center, Computer Sciences & Tech. (CCST)	1,482	2,022	3,389	3,927
Total	$24,239	$21,610	$21,422	$15,010

Source: OESL, June 3, 1970.

The relative impact of the decline may be seen in Table 3.2 where the percentage allocation of travel funds among Institutes is compared with the percentage distribution of standards committee-work expenditures. The sharp drop in travel funds for IAT has been tolerable, largely because the 1970 IEC meeting was held in Washington.

The basis for the OESL file on committee activities is form NBS-83, Committee Assignment Record. This form is submitted for all committee assignments of NBS staff members. Coordination through the OESL is required for standards committees (Ad. Manual Chapter 3.02), although the form does not provide for identification of these. The Committee Registrar who receives the completed forms is in the Management and Organization Division.

Table 3.2 Comparison of distribution of international travel funds with distribution of total expenditures for standardization committee work

	International travel funds*		Total cost of committee work**	
	FY 69	FY 70	FY 69	FY 70
Dir. Off.	8%	11%	0%	0%***
IBS	27	27	21	22
IMR	7	15	11	13
IAT	38	21	39	41
CRR	5	0	5	4
CCST	16	26	23	20
	101	100	99	100

*Source: Table 3.1, above.

**Source: Table 3.3, below.

***Table 3.3 includes no costs for the Director's Office except for those incurred in the Office of the Associate Director for Information Programs.

NAME *(Last)* *(Mr. - Mrs. - Miss - Dr.)* *(First)* *(Initial)* | DIVISION & SEC. | DATE

SPONSORING ORGANIZATION | POSITION ON COMMITTEE, OR OFFICE

NAME OF COMMITTEE *(Include symbol, if any)* | NAME OF SUBCOMMITTEE *(Include symbol, if any)*

TYPE OF APPOINTMENT

- ☐ OFFICIAL SPOKESMAN, NBS
- ☐ TECHNICAL REPRESENTATIVE, NBS
- ☐ INDIVIDUAL PARTICIPANT, OFFICIAL TIME/FUNDS MAY BE USED
- ☐ OFFICIAL SPOKESMAN, DEPARTMENT
- ☐ TECHNICAL REPRESENTATIVE, DEPARTMENT
- ☐ INDIVIDUAL PARTICIPANT, OFFICIAL TIME/FUNDS WILL not BE USED

METHOD OF APPOINTMENT

DATE OF APPOINTMENT | DATE APPOINTMENT EXPIRES | INITIALS OF SECTION CHIEF AND SIGNATURE OF DIVISION CHIEF

REMARKS | SIGNATURE OF APPROPRIATE BUREAU OFFICIAL *(If needed)*

INSTRUCTIONS - Send original and three copies to Committee Registrar (Washington and Boulder), together with pertinent correspondence. Two approved copies of the form and the correspondence will be returned to the Division Office.

CERTIFICATION OF COMMITTEE REGISTRAR

FORM NBS-83 (REV. 8-65) U.S. DEPARTMENT OF COMMERCE NATIONAL BUREAU OF STANDARDS

COMMITTEE ASSIGNMENT RECORD

USCOMM-DC 32046-P65

Using the file of forms NBS-83, the OESL has developed a punched card file and a computer program that can be used to produce lists sorted according to Divisions, sponsoring organizations (ASTM, IEEE, etc.), or subject. The OESL

file includes all committee assignments, even those having nothing to do with engineering standards. (Slightly more than 50% of the committees listed are standards committees.)

The OESL computer listing has been circulated to the Divisions several times recently for correction and updating. It was the basis for the internal NBS publication, Technical and Scientific Committee Memberships of NBS Staff, November 1969. It was also the basis for the Panel's questionnaire survey and for the collection of cost data for Dr. Kushner in February 1970. The latter two events led to a good deal of updating and weeding out of the OESL list.

The OESL, like the Office of Product Standards (under an earlier name), was established in response to recommendations of the LaQue report.

The OESL consists of a chief, one assistant, and two secretaries. Salary and overhead costs for full-time operation of the office would be approximately $120 K. (This figure seems to be more appropriate than the actual FY70 cost, for the purposes of the Panel's study.)

Additional discussion of the activities of the OESL will be found in Chapter 7 on International Standards.

3.2.3 Office of Engineering Standards Services

The OESS "cooperates with and assists producers, distributors, users and consumers of products, and agencies of the Federal, State and local governments in the development of standards for products; develops safety standards required by statute; conducts appropriate sampling, testing, and evaluation; and provides information services with respect to engineering standards" (D.O. 30-2B, December 11, 1968).

The staff and costs for this Office are as follows (for FY70):

Product Standards Section 10 Professional Standards coordinators 5 Secretaries	$240 K
Information Section 2 professional and semiprofessionals 1 Secretary	60 K
Division Office including management, editorial, and the relatively inactive Mandatory Standards Section	75 K
Total	$375 K

The main activity of the office is the administration of the Department's procedures for the Development of Voluntary Product Standards. See Chapter 8.

3.2.4 NBS Technical Divisions

NBS participation in voluntary standardization consists chiefly of the multifarious contributions made by about 350 technical people. Before considering these (in the next section), however, we note some distinctive differences at the Institute and Division level. A few divisions or sections (Building Research, Electronic Technology, Electricity, Office of Information Processing Standards, Engineering Metrology, High-Frequency Electrical Standards) are--or have recently been--headed by chiefs who strongly encourage and promote standardization committee participation by their staffs.

Interesting and suggestive differences of emphasis with respect to cooperation with standardization organizations may be found in the language of D.O. 30-2B and Administrative Manual Chapter 9. For IBS, all divisions "provide advisory services to Government, science, and industry on basic measurement problems." For IMR, all divisions "assist industry and national standards organizations in the development and establishment of standards; and cooperate with and assist national and international organizations engaged in the development of international standards." The IAT "maintains cooperation with public and private organizations leading to the development of technological standards (including mandatory safety standards), codes, and methods of test." CRR divisions engage in "research, measurement, and application of radiation to the solution of Bureau and other institutional problems, primarily through collaboration." In the CCST, the Office of Information Processing Standards "provides leadership and coordination for Government efforts in the development of information processing standards at the Federal, national, and international levels." (All quotations are from D.O. 30-28.)

An over-all picture of the level of NBS activity in standards committee work was prepared for Dr. Kushner in February-March 1970. The result is shown in Table 3.3, giving the distribution of estimated costs by source of funds and by Institute/Center.

Roughly comparable data for FY1969 were obtained by the Panel's survey and generally agree with the results given in Table 3.3. See Table 3.4.

Table 3.3 Estimated Costs of NBS Participation on Voluntary Standards Committees

	RTS Funds		Overhead Projects		Other Projects		Total	
	FY 1969	FY 1970	FY 1969	FY 1970	FY 1969	FY 1970	FY 1969	FY 1970
IBS	208,700	237,900	11,700	13,600	35,700	39,700	256,100	291,200
IMR	73,000	83,800	34,800	39,300	28,200	50,800	136,000	173,900
IAT	344,400	384,600	13,000	23,400	112,900	123,700	470,300	531,700
CRR	29,100	27,800	4,900	5,600	21,000	17,000	55,000	50,400
CCST	243,400	220,600	26,100	27,100	8,400	10,000	277,900	257,700
ADIP	2,300	2,300	2,900	3,200	-	-	5,200	5,500
Totals	900,900	957,000	93,400	112,200	206,200	241,200	1,200,500	1,310,400

Prepared by OESL for Dr. L. M. Kushner, April 1, 1970. A copy of the memorandum defining the costs report here is attached to Appendix C (Exhibit B).

Table 3.4 Estimated Costs of NBS participation in FY 69, from Table 3, (i), and from the Panel's survey, (ii). (Thousands of dollars)

	(i) Table 3	(ii) Survey*
Dir. Off.	5	11
IBS	256	240
IMR	136	149
IAT	470	480
CRR	55	38
CCST	278	156
Total	1,200	1,074

*Costs, as estimated from survey results, include travel costs plus $150 times total man-days (except that memberships in international standards or "standards policy" committees were costed at $200 per day).

In terms of numbers of people involved and also in terms of the level of effort by those people, the standards committee work is most heavily concentrated in IAT (relative to total size). Within IAT, the activity is concentrated heavily in the Building Research Division (117 committee memberships, about twice as many as any other division, and almost as many as all of IMR). See Appendix C, Table 0.1.

One broad difference among the major organizational units shows up in Table 3.5. IMR and IAT are relatively heavily involved with ASTM committees while the other units have their committee assignments more concentrated in ANSI.

Table 3.5 Committee memberships for national standards-writing committees, by Institute/Center and by standardization body served (699 memberships)

Institute/Center	ANSI	ASTM	IEEE	Other	Total
Dir. Off.	7	3	--	2	12
IBS	106	35	46	36	223
IMR	12	102	1	18	133
IAT	66	103	12	102*	283
CRR	11	2	--	1	14
CCST	29	1	--	4	34
Total	231	246	59	163	699

*Mainly SAE, ASHRAE (American Society for Heating, Refrigerating, and Air Conditioning Engineers), and ACI (American Concrete Institute).

Source: The Panel's Survey.

Another kind of broad difference among Institutes has to do with the relative amounts of money spent on travel during a period when severely limited travel ceilings were imposed.

Travel cost for standards committee work, FY1969, as reported in the Panel's Survey:

Institute/Center	Total travel cost	Committee Membership
Dir. Off.	$ 2,360	12
IBS	15,946	233
IMR	14,249	133
IAT	34,653	283
CRR	5,038	14
CCST	18,357	34
	$90,603	

NOTE: Travel funded by OESL may not be included; the questionnaire did not ask for source of funds.

Question 14 in the Panel's survey asked "Has your participation been limited or restricted in one way or another?

No	423	
Yes, travel	184	(including 34 of 40 from Boulder)
other	78	
No answer	11	
	696	

3.3 Individual Participants: Level of Activity, Roles, Motivation and Rewards

The details of NBS participation change from week to week as committees of the private standardization bodies are formed, merged, reorganized, and dissolved; and as NBS staff members arrive, move into new duties, and depart.

We estimate that 350 members of the NBS technical staff hold 950 memberships on voluntary standardization committees. Problems of definition of a committee membership are discussed in Appendix C. The Panel's survey obtained reports from approximately 300 people covering approximately 850 committee memberships, and the estimate above was obtained by arbitrary adjustment to account for the 15% non-response rate (see Appendix C).

The most important observation to be made about individuals' activities is that for most of the 350 people it is a very occasional activity. As seen in Table 3.6, at least half of the committee participants account for less than $2000 each, including travel costs. One way to summarize Table 3.6 is to observe that roughly speaking one-third of the total cost ($1200 K) is attributable to 15 to 16 people who are intensively involved; one-third of the total cost to another fifty or so very active participants; and the remaining one-third of total cost is spread over more than 250 others (including inactive and zero-cost committee participants). The median cost for participants listed in Table 3.6 is close to $2000, except in IAT where it is about $4000.

Zero-cost committee participants are not necessarily inactive. Much committee work is done out-of-hours. A recent (April 1970) review of committee activities in the Product Evaluation Division found that 25 percent of the time spent on nongovernment standardization committee work was spent out-of-hours. Survey respondents from many other divisions wrote comments to the same effect.

Committee activity may also be described in terms of frequency of meetings and correspondence. NBS participants do not, however, generally attend all meetings; we have no data on this. The Panel's survey results are summarized in Tables 3.7 and 3.8.

Tables 3.9 through 3.12 give various summary descriptions of the participants in domestic standards-writing committees. More detailed versions of these tables are given in Appendix C. The tables report survey responses for 697 committee memberships (with a few tabulation discrepancies).

Table 3.6 Distribution of committee participants by level of Expenditures, FY 1969

Estimated Cost	Number of persons reported*						
($)	IBS	IMR	IAT**	BRD°	IAT total	Other°, °°	NBS total
1- 2000	52	43	26	17	43	14	152
2001- 4000	10	18	11	8	19	8	55
4001- 6000	3	4	5	8	13	5	25
6001- 8000	1	3	5	4	9	4	17
8001-10000	3		2	2	4		7
10001-15000	3	1	3		3	3	10
15001-20000	2		2		2	2	6
20001-25000				1	1	3	4
25001-30000	1		1	1	2	1	4
30001-35000			1		1		1
35001-40000	1						1
Total	76	69	56	41	97	40	282

Source: Tables supplied in response to Dr. L. M. Kushner's memo, except as noted. See Appendix C (Exhibit B) for a copy of the memorandum.

*Persons for whom zero cost was reported are not included (since most were not reported at all in the main source for this table.)

**All except the Building Research Division (BRD).

°From the Panel's Survey.

°°Director's Office, Center for Radiation Research, Center for Computer Science and Technology.

Table 3.7 Frequency of Meetings

Frequency	Type of Committee		
	National	International	"Policy"
3 or more per year	139	4	19
Twice a year	301	10	20
Annual or biennial	165	38	19
None	78	16	7
No answer	12	1	6
Total	695	69	71

Table 3.8 Frequency of Committee Business by Correspondence

Frequency	Type of Committee		
	National	International	"Policy"
3 or more per year	319	44	37
Twice a year	190	15	11
Once a year	97	6	9
None	73	3	6
No answer	17	1	8
Total	696	69	71

The median standards committee participant is somewhat older than the median Bureau professional employee (as might be expected, since few junior staff members are given committee assignments). The age and GS grade distribution is displayed in Table 3.9, where it is interesting to note the similarity among the age distributions in grades 12, 13, 14.

There are more than 100 committees on which NBS has been represented by the same person for more than 10 years. Aside from this fact, Table 3.10 does not have a simple interpretation. The questionnaires asked for length of service on each committee. The answers do not provide information about the lifetimes of committees, since the data inevitably reflect the effects of new NBS activities starting up.

Table 3.9 Distribution of Survey Respondents by Age and Civil Service Grade, for National Standards-Writing Committees

GS Grade	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	Total
9-11	2	2	2	2	3	1	-	-	-	12
12	2	7	5	5	6	4	3	1	2	35
13	2	4	7	13	12	14	4	4	2	62
14	-	5	10	16	12	15	13	4	2	77
15	-	-	10	8	15	18	9	4	5	69
16-17	-	-	1	5	4	2	9	-	2	23
Total	6	18	35	49	52	54	38	13	13	278

Median Age Group: 45-49
Median Grade: GS-14

Table 3.10 Number of years on committee

1 or less	122
2	99
3	71
4	50
5	54
6-10	178
11 or more	108
No answer	15
Total	697

With respect to continuity of participation, approximately half the committee memberships are backed up by NBS staff capability to substitute or take over (Appendix C, Table 16).

Voting and office-holding on standardization committees have been questioned by some. Table 3.11 indicates the magnitude of the problem that would arise from a major change in present NBS policies.

Table 3.11 Question 7. Your status on the committee is:

(a)	Nonvoting member	24
(b)	Observer	23
(c)	Voting member	439
(d)	Officer	129
(e)	Technical advisor	49
(f)	Other	27
	No answer	5
	Total	696

Assuming that officers are voting members (and many respondents checked both categories but are counted here only once, as officers), we find that 568 or 82 percent of committee memberships are voting memberships. In replies to Question 27(a) of the Panel's survey ("Can you give an example of an NBS contribution that prevented a serious error or blunder?") there were several instances cited where the NBS member felt he had been effective by casting a lone negative vote. Thus, for example, when urethane foam insulation materials were first introduced an NBS participant prevented the adoption of a design value for thermal conductivity that neglected the effect of predictable degradation. Another example: NBS blocked the standardization of a test method for children's seat belts that would have excluded all but one type of restraint system for children.

The strength of NBS support for the private voluntary standardization system is indicated by the fact that the Bureau houses 129 committee officers (chairman or secretary, usually). Some survey respondents who serve as officers wrote comments about the amount of time consumed in clerical operations and suggested that such responsibilities should be avoided if possible. On the other hand, there were respondents who took pride in having stimulated the creation or productivity of a committee by accepting an officership.

The survey results summarized in Tables 3.12 and 3.13, concerning "motivation" and "rewards", might be considered in connection with selecting people for assignment to standardization committee work and supervising or reviewing such activities. More detailed results are given in Appendix C, Tables 5 and 21, respectively, by Divisions.

Some insight into the respondents' interpretations of the "motivation" categories in Table 3.12 is obtained from comments written under "Other" and from remarks written under the open-ended Question 27.

--- Frequently mentioned under "Other" were the intended beneficiaries of, say, a safety standard.

--- At least 30 people commented on the satisfaction arising from mediating between opposing viewpoints or competing economic interests.

--- Many people commented on the value of committee work as a means for disseminating or promoting NBS services and expertise such as calibrations, Standard Reference Materials, new test methods, and measurement methodology.

The writers of the questionnaire felt that category (b) in Question 5 might in some cases be interpreted as implying some degree of compulsion, or at least strong management approval. "Important to management" was checked most frequently by respondents from organizational units where standards as such are viewed as an important output. Thus (b) was the predominant primary motivation checked by respondents from the Center for Computer Sciences and Technology, and was the runner-up (with 22 percent) for the Institute for Applied Technology. In the Institute for Basic Standards, on the other hand, only 5 percent checked (b).

The popularity of category (d), "To provide an unbiased opinion or technical assistance", probably reflects some or all of the following: (i) it is the only category with the word "technical" in it; (ii) it is impersonal; (iii) NBS staff members take pride in their individual exercise of judgment and their individual and collective expertise.

This is consistent with the replies to Question 17, "How would you describe your primary input to the committee?" to which 511 or 73 percent replied "Technical advice". See Appendix C, Table 17.

The variety of motivations to engage in standardization committee work may be indicated by two quotations (from replies to Question 27) representing extremes:

"I serve because I thought I was supposed to. I would rather not."

"... I would carry it on if necessary without NBS backing."

Table 3.12 Question 5. What is your primary motivation to serve on the committee?

(a)	Professional development	43
(b)	Carrying out a role that management feels is important	126
(c)	Personal interest	37
(d)	To provide an unbiased opinion or technical assistance	348
(e)	Guidance of NBS R&D programs	80
(f)	Other	57
	No answer	6
	Total	697

The survey respondents' comments about "rewards" were illuminating. The large numbers of "no apparent reward" and "other" responses in Table 3.13 were backed up by a variety of remarks such as (paraphrasing):

--- It's part of my job.
--- Somebody has to do it.
--- Personal satisfaction (at least 2 dozen)
--- The work is important; rewards are irrelevant.

Here, again, benefits to specific groups were occasionally mentioned. Also, the acquisition of technical information and professional contacts was listed as a reward. In a few cases, a publication arising out of standardization work was mentioned.

Table 3.13 Question 21. How has your participation in this committee been rewarded?

(a)	Significant factor in promotion	18
(b)	Increased prestige at NBS	63
(c)	Increased prestige in professional community	303
(d)	No apparent reward	317
(e)	Other	121
	No answer	55
	Total	877

3.4 Impact and Benefits: The Participants' Views

Whereas the preceding section was concerned with standardization committee work as a part of the participants' NBS activity, this section looks at standardization work as a mode of interaction between the NBS staff and the world outside -- other agencies, the technical community, business and industry, state and local government, and the general public.

This section opens with a discussion of three tables that may be helpful as an overview of NBS voluntary standardization activities: in general terms, what is being standardized, how, and for whom? Discussion of the tables is followed by discussion of some of the non-quantitative information given in the Questionnaires.

Table 3.14 is based on a classification of types of standards according to function. The percentage distribution shown (omitting "no answers") was obtained as follows: If two categories were checked, each answer was counted with unit weight. If only one category was checked, the answer was counted with double weight. If more than two categories were checked, "other" was counted (with double weight). Thus this is roughly the distribution of committee memberships (not necessarily of total effort) among the several types of standards.

Table 3.14 Type of Standard

Question 3. Which type of standard is the committee concerned with? (Check at most two items).

(a)	Engineering Design	6%
(b)	Specification (material, system, etc.)	14
(c)	Dimensional	3
(d)	Test method	31
(e)	Standard practice	21
(f)	Nomenclature, units, symbols	11
(g)	Performance	8
(h)	Other (Specify)	6
	Total	100%

The survey was conducted before the Panel had established the classification of standards given in section 1.4 (nonproduct, industrial product, etc.) and no data are available on the distribution of NBS participation among these four types.

Table 3.15 presents a classification of committees by subject category. Note that this table, based on the OESL card file, includes all committees. Nearly half of the people and nearly half of the committee memberships listed are not engaged in voluntary standardization work.

Table 3.15 NBS Committee Participation by Subject Category

Category	Number of People	No. Committee Memberships
Civil Engineering/Construction	38	138
Telecommunications	10	13
Mechanical Engineering	48	137
Electrical/Electronics Engineering	95	238
Instruments/Measurements	17	41
Automotive/Aircraft	14	37
Materials Handling	2	2
Photography/Motion Pictures	9	20
Ferrous Materials/Metallurgy	6	7
Physical Metallurgy	21	61
Nonferrous Materials/Metallurgy	11	20
Instrumentation	24	48
Rubber	1	4
Chemicals	45	88
Chemistry	26	35
Textiles	5	20
Mining	1	1
Nuclear	29	70
Physics	25	44
Paper	6	19
Safety	27	53
Policy	88	162
Acoustics/Vibration/Shock	10	44
Mathematics/Statistics	9	15
Metrology	32	49
Information/Dissemination	18	27
Fire	12	50
Testing Methods	41	73
Computer	31	71
Drawings/Symbols/Abbreviations	6	11
Miscellaneous	75	112
Total	682	1710

NOTE: This compilation derives from a June 1970 printout and includes all known NBS committee activity. It is important to consider these summaries as gross indicators since no category has been carefully defined. Some have been chosen by the individual and others by OESL.

The survey question about the primary beneficiary of a committee's work was one that elicited many protests from respondents; "Other" often means "all (or most) of the above" in Table 3.16. Also, one committee often works on several kinds of standards. Category (d), Scientific and Engineering Community, is the least specific of those listed, which may account in part for its popularity.

Nevertheless, it is noteworthy that a great many of the NBS staff members who participate in committee work seem to think of it as technical "advisory and consulting services" rather than as part of a "standardization system".

Table 3.16 Question 4. Who is the primary beneficiary of the standard? (Check only one.)

(a)	Household consumer	47
(b)	Industrial consumer	146
(c)	Producer	48
(d)	Scientific and Engineering Community	297
(e)	Government (local, state, federal)	31
(f)	Other	88
	No answer	32
	Total	689

In the remainder of this chapter, an account is given of some of the remarks that were written in reply to the optional Question 27, and elsewhere in the margins of the questionnaires.

Approximately 70 percent of the respondents accepted the Panel's invitation to comment, with answers ranging from short ("Yes, it is worth it") to long (3-page essay by C.S. McCamy).

The last part of Question 27(d), "Is it worth the effort and expense?"--in a questionnaire addressed to committee participants--would be expected to elicit affirmative replies. In fact, most of those who commented did say "Yes". But many said so with qualifications. The most frequent type of qualification had to do with the amount of time devoted to committee activity:

-- after all, it's only a few days a year
-- most of this work is done out-of-hours
-- if increased, it could easily become a burden
-- "One NBS member is sufficient..."

Some replies were vigorously affirmative, and at least ten people suggested that NBS participation, in specific areas should be increased. On the other hand, there were some doubters ("I hope so") and five or six firm negatives. Two of the extreme replies were quoted in the discussion of Table 3.12 in section 3.3; two more are given here.

-- "Lost cause ...need for standards esthetic only"
-- "Essential to our mission"

The following is a rough summary of comments on benefits arising from participation in standardization committee work. Under each heading, types of comments are listed (approximately) in decreasing order of frequency.

Benefits to the committee

NBS technical expertise
NBS impartiality
need for government representation
credibility of the standard
compatibility of national and international standards

Benefits to the NBS

information about state-of-the-art, and industry or other agency needs
technical communication
enhance NBS prestige
guidance to NBS programs
promote calibration or Standards Reference Materials services
savings through collaborative efforts
professional growth
opportunities to obtain other agency funding
recruiting

General benefits

disseminate technical information, especially measurement and test methods
scientific reference materials
consumer or public safety
services to (specific) industry
promote technological progress
improved measurement compatibility
standardization (itself; for savings; performance)
services to Federal procurement

promote metrication

services to regulatory agencies (e.g., air pollution measurement)

The principal impression that remains with a reader of the respondents' comments is that standards and standardization committee work are viewed as a part of the over-all system of technical communication.

Chapter 4
Issues Associated with the Voluntary Standardization System

4.1 Introduction

The voluntary standardization system of this country has often been criticized. A recent example is the report issued in June 1970, by the President's National Commission on Product Safety. The press release accompanying the report specifically cited "the failings in the voluntary standards-setting system of industry" as one justification for greater Federal authority for developing safety standards. "The Commission came to the conclusion that self-regulation by trade associations and standards groups and independent testing laboratories was 'legally unenforceable and patently inadequate'."

Among the invited guests who met with the panel, among the staff of NBS consulted and among the panel members, opinions about the present system cover almost the entire range from complete condemnation to ardent support. The critics of the privately managed voluntary system tend to point out the failure to provide standards adequate to protect health and safety and the interests of the ultimate consumer. Proponents of the system contend that it is lack of adequate support in money and people that has resulted in some rather obvious inadequacies in the performance of the system and the failure to be completely responsive to the need of the nation. In their view the system can work well if it has the needed resources. The heavy critical interest in the "system" suggests that it should be reviewed carefully and possibly changed. Because of the historical involvement of NBS in voluntary standardization, it is appropriate and perhaps imperative that we also review our role in order to exercise our influence to make the system more responsive to the public interest and need. It is not the intent of this chapter to perform these reviews, but it is intended to identify the important questions and problems that need attention.

4.2 The NBS Role in Voluntary Standards

Panel queries to consultants and to NBS staff as to the possible role of NBS have elicited a range of suggestions from increased support of the present voluntary, privately managed system to the assumption of complete control and direction of standards writing. This diversity is consistent with the wide range of opinions about the faults and merits of the present arrangement. The resolution of what, if anything, is wrong with the system,

and what NBS should do about it raises the question of the extent to which NBS should support the voluntary system.

The question will probably be answered differently for different kinds of standards work. Elsewhere in this document domestic standards activities were classified in four categories: (1) non-product engineering standards, (2) standards for products sold mainly in the industrial market, (3) standards for products sold mainly in the retail (consumers') market and (4) standards which become mandatory in application through codification. International standards work is here treated separately, although it is always concerned with one or more of the above categories. This classification scheme developed because Panel participants found that attitudes toward participating in standards work were different in the different categories. The issue can be stated:

To what extent should NBS support the voluntary system for

a. Non-product standards
b. Industrial product standards
c. Consumers' product standards
d. Standards for codes and regulations
e. International standards

In arriving at the answer, it will be necessary to fix priorities and allocate resources. It is not possible to arrive at an external policy for NBS separate from the internal policies and the mission of NBS and its constituent parts. For example, much of IBS and IMR interest is in standards of category a; the Building Research Division has great involvement in area d; the Computer Center has assigned responsibilities for information processing standards, classed in category b. NBS has been assigned the Department of Commerce Voluntary Product Standards (VPS) responsibility. With the exception of specific areas assigned to DOC and NBS by Congress, or derived from assignments made to other departments, NBS has probably been least concerned with category c --consumers' product standards and it is here that most of the complaints and attention have centered recently. It seems worthwhile first to discuss problems of NBS involvement in this area in some detail, remembering that this is only part of the entire problem.

4.2.1 NBS and Voluntary Standards for Consumers' Products.

Voluntary standards for consumer products are usually written by groups of industry experts with little or no participation by the consumer or a competent consumer representative. Where matters of safety are concerned, the Underwriters' Laboratories have attempted to represent the user's interests in developing adequate standards and they have accomplished a great deal. However, in the eyes of the National Commission on Product Safety, "the right to interfere substantially with competition in the interest of public safety lies almost wholly in the governmental domain. A safety standard which significantly impedes competition should be promulgated and enforced by governmental, not private bodies." This conclusion stems from the argument that only the Government has, or should have the right to close the market to products not meeting some minimum safety standard. By a not too illogical extension, a similar argument can be made on behalf of the consumer with respect to product quality, it being difficult to decide where health and safety stops and general welfare starts. The Government is concerned already with honesty in advertising, packaging, and labeling. There are independent testing laboratories which assign ranks of quality to products, with some success but certainly without universal acceptance of their findings. Displeasure with a specific situation which has been great enough to cause the Congress to take action is the preparation of a grading system for automobile tires, a task which has fallen to NBS. This is the first excursion of Government into mandatory quality grading of manufactured products and perhaps the prototype of the satisfaction of consumers' needs for product information.

In addition to insufficient representation of the consumer in the process and because of its completely voluntary features, the system exhibits two additional important shortcomings. One of these is the lack of an adequate mechanism for identifying needed standards and initiating action--something the system now leaves pretty much to an individual champion. As a result there are relatively few standards for consumers' products. The other fault, alluded to in the previous paragraph, is the lack of any method of assuring that a good standard will be used even if it is written. The view of the Justice Department is that compliance with a voluntary standard must not be forced by the action of private bodies; this being a prerogative of the Government. Even in standards writing, a fear of antitrust consequences--real or imagined--has been cited by industry representatives as an important limitation on fullest cooperation.

Here indeed are issues!

> Should NBS support the private voluntary system for preparation of standards for the quality of consumers' products? If so, how involved should it become--setting acceptable quality levels? Identifying the pertinent performance characteristics? Providing adequate test methods? Doing acceptance testing? Issuing certificates of compliance? Qualifying laboratories as capable of doing such testing? Acting as a referee or ultimate test authority? Pointing out areas needing standardization? Sponsoring the standards committee work? If not the private system, what alternative should NBS support?

It is not clear that government support of the system will by itself guarantee that the system will work better to generate adequate consumers' product standards. For instance, the consensus procedure which is intended to protect a minority and also to give some assurance that a standard will be used after it is issued, has been criticized by Morris Kaplan of Consumers' Union because "... it means in practice that the industry people have veto power over any action taken by the committee." That is to say that unless all the participants are men of good will, no consensus can be reached, no standard will ever issue, and only the view supported by the most stubborn and persistent will prevail.

The related accusation is also commonly made that the process of getting a standard out is at best long and arduous, and that the consequent results are too late and probably too little. There is no doubt that it often takes a long time to get a standard issued, but this is a characteristic not unique to the privately managed voluntary system. The VPS of the Department of Commerce can also be slow, and even the mandatory standards issued in response to the requirements of Acts of Congress take a long time, if an affected party wishes to exhaust all of his rights under the Administrative Procedures Act. The process is slow because it is democratic and designed in principle so that everyone can be heard. Radical speed up could probably be obtained only by substituting a more autocratic procedure.

Is consensus really needed in preparing standards?

The most severe critic of the present system suggested that continued participation by NBS might be a waste of time because little that is useful could be accomplished--this view was relative to consumers' product standards. The Government could decide to withdraw entirely from participation in the private system. One likely effect of this decision would be the demise of the system as we now know it without creation of a viable substitute. The alternative of setting up a government operated system to replace the privately operated system would require legislation and it is not clear that such a move would improve the situation. Although this eventuality is not ruled out, it is probably too remote a possibility to consider as a planning alternative for action in the near future.

There are intermediate possibilities, of course. The Government could continue to support the voluntary system, and increase its role in the management of the system. The possibility exists of granting the Government broad stand-by rights; if the voluntary system failed to satisfy a standards need, the Government would prepare and issue the standard. Alternatively, working within the system, the Government could identify a need and sponsor a committee to respond, following the present procedures of ANSI. If money and people are all that are needed to make the present system work, the government could provide these. It is unrealistic to expect that any sizable increase in financial support would be provided without some increase in government management of the system.

Should government increase its support of ANSI? Is NBS an appropriate channel for the support? How much influence over ANSI would NBS want?

Under what circumstances should NBS, working in the present system, initiate standards preparation? Sponsor committees?

One other point about standards for consumers' products should be mentioned--they pose a special problem in the international standards field, basically because the minimum performance level acceptable in a country of low per capita income is apt to be rejected out of hand by representatives of a more affluent country. Furthermore, the attitudes toward standards of this kind are quite different between free enterprise and controlled economy countries. These differences often lead to some form of quality grading, if there is to be a useful international standard. This frequently complicates the reaching of an international consensus. A solution

often evolving has been the recognition of a number of local or national standards under an international umbrella, an international standard in form, but not in fact. However, international agreement on minimum acceptable levels of protection to health and against personal injury and property damage should be possible and has already been reached in some areas.

4.2.2 Non-product Standards

The preceding section deals with policy questions concerning the NBS interface with the existing system, with emphasis on the problems of standards for consumers' goods, dealt with first because this is the area under major attack, and because the attack is often generalized to the entire voluntary system. The generalization is unwarranted and probably misleading. The panel has heard few complaints about the performance of the present system in the non-product field: the preparation of standards for definitions, terms and symbols, and for generalized test methods. The few criticisms voiced have been directed at the arduous and time consuming procedure--but as we have already observed, this is the character of the democratic processes used. The results of the work are clearly not happily received by everyone, but a consensus is not necessarily unanimous, and an objecting minority is not unusual.

4.2.3 Industrial Product Standards

Most of the activity now going on in both domestic and international voluntary standards groups is in this category--standards for products exchanged in the industrial market. Here again the general complaint of slow procedures is made. However, unlike the consumer case, all directly affected parties usually are represented in the work, the consensus is an agreement among them and the resulting standard is used. In the preparation of these standards, however, the interest of the general public may be overlooked. For example, buyer and seller may agree on a standard for a material, but the interests of the user of a product made from the material and of the general public may not have been adequately considered. Troublesome problems have come to the fore recently--the detergent that does an excellent cleaning job but pollutes the water supply because it does not break down chemically--the insecticide that kills insects but weakens bird shells--disposal of the accumulating solid waste in the various forms of metal, glass, and plastic containers. Whether anyone would have been wise enough to foresee these troubles and also persuasive enough to avoid them through the standards route is moot. Perhaps the pattern can be altered in the future.

Should NBS participants try to represent the affected but unrepresented parties (possibly the real "silent majority")?

4.2.4 Codified Standards

Type 4 standards, those that are prepared by voluntary process but then made obligatory or mandatory by codification represent a peculiar problem. For example, the National Electrical Code (NEC) is issued as an ANSI Standard and is revised and updated each three years by the National Electrical Code Committee of the National Fire Protection Association. It is intended for and is commonly incorporated into the codes of local county and similar governmental units, where it becomes mandatory in application and use.

The NEC speaks of "listed" equipment and material, and in effect this means listed by Underwriters' Laboratories (UL), although the NEC does not mention UL explicitly. This means that the decisions of UL on "listing" have the effect of acceptance or rejection of a product in the case of most jurisdictions using the NEC.

The question of how codes are prepared and enforced was considered by one of the Task Forces of the LaQue Panel. Their concern was centered on the building codes--and the related standards, which constitute most of the standards in our category 4. Their recommendations have not been implemented nor followed upon. NBS has made its own study of the building code and related standards areas and developed a program in support and assistance to the States, who have the main regulatory responsibility. This program started in 1968 with the organization called "The National Conference of States on Building Codes and Standards," (NCSBCS). NCSBCS is in its infancy; however, the response by the States, collectively, has been more than anticipated in such a short period. If the present leadership of NCSBCS continues, most of the problems in this area will find satisfactory answers through direct assistance of NBS.

4.2.5 International Standards

The way the United States participated in the various international standardizing bodies is described in Chapter 7. The U.S. position expressed at the meeting of an international body reflects the stated opinion of the group or groups writing related domestic standards in the United States. When the domestic apparatus cannot reach a timely decision, the U.S. delegate may have to abstain from the work of the international committee.

Thus, the weaknesses and strengths of the domestic system are included and even magnified in our international representation. Moreover, the delegate who presents and argues for the U.S. point of view at a meeting is often a volunteer whose employer is paying the costs of his participation. Neither the quality nor the continuity of representation is assured by this method.

Fundamental here is the fact that the foreign trade concern of any one manufacturer or trade group may not be large enough in its view to warrant the needed commitment and support. However, the national concern often transcends these individual interests. The emerging test and certification practices of International Exchange of Authenticated Electronic Component Performance Test Data, (EXACT), the Tripartite Agreement (France, Great Britain and Germany), and its successor administered by Committee for the Coordination of European Standards in the Electrical Field, (CENEL), the possible institution of a worldwide test and certification procedure administered by the IEC are all indicative of the need for decision. Determining the U.S. attitude toward international standards participation and consequent action is a Government-wide problem. The national goals for international participation must be identified and the means for attaining these goals must be brought to the required level.

For NBS, issues are:

In which, if any, International Standards activities should NBS participate?

Should NBS seek authority to permit enlarging its role in international standardization?

Should NBS urge legislation to strengthen ability of ANSI to serve interests of the United States in international legislation?

A special problem is faced in connection with the International Organization of Legal Metrology (OIML). Legal Metrology is that field of measurement covered by law, and usually is concerned with the honesty and accuracy of measurements made in the exchange of goods. Although the main concern of OIML is with legal metrology pertaining to the metric system, it also concerns itself with problems that are not dependent on the system of units being used. The members of OIML are typically the respective national legal metrology organizations. In the United States, a Federal body of this kind does not exist (because authority resides in the States), and the United States is not a member of OIML.

In the United States, many of the legal metrology functions are performed by state and local governments and the National Bureau of Standards through the Office of Weights and Measures serves as the central focus for Federal concern in this field. Since the OIML provides for needed international cooperation, the following issues emerge:

Should the United States join the OIML?

Should NBS actively seek to be the U.S. representative in the OIML?

Mention has been made elsewhere that the standards system is continually changing. In the international field this is particularly true and a trend is clearly emerging that must be taken into account in any planning of U.S. involvement. The obvious trend is that many countries are reducing their national standards activities in favor of international work. The clearly stated objective of some is that international standards should have precedence and national standards work should be limited to identifying those changes to international standards which are absolutely necessary because of peculiar national conditions. This is in contrast to the more prevalent and recently the only procedure in which the international standards task was to harmonize a number of pre-existing national standards. Whether this international approach to standards writing would be acceptable to the United States is yet to be determined, but failure to face the problem and to reach a clear and timely decision may let others decide whether the United States is to be technologically isolated.

The problems associated with the conversion to the Metric System of Measures by the United States is the subject of a separate "Metric Study." Possible alternatives involved in that choice have a parallel in the question of international vs. domestic precedence in the writing of standards.

Issue:

Should NBS be authorized to study the effects of following a standardization policy giving precedence to international voluntary standards over comparable domestic standards?

4.2.6 NBS and DOC Voluntary Product Standards

The Voluntary Product Standards (VPS) program has existed within DOC ever since Herbert Hoover was Secretary of Commerce. It has been moved around within the Department, the need for its existence has been challenged from time to time, and its stated purposes and procedures have been modified

several times in response to comments and criticism from many sources. This history is discussed in more detail in Chapter 8 and many contentions are discussed there.

The VPS program is now a part of the Office of Engineering Standards Services of NBS. In brief, it serves as an alternate or substitute mechanism for preparation of a voluntary standard. One alternative to the VPS program would be for DOC/NBS to offer to serve as sponsor of standards committees working within ANSI whenever an industry group needed and could not find a sponsor. However, to cease offering the VPS program would require legislation.

There are some clear issues:

Should the VPS program be continued? If so what role should it play?

Should NBS modify the VPS procedures so that all VPS are sent to ANSI for issuance as ANSI standards?

Should NBS use the VPS program to develop needed consumers' product standards? Pay the expense of consumer participants?

How should DOC and NBS allocate resources between support of VPS and participation in the privately managed system?

4.3 Internal Management

The preceding portion of this Chapter has been concerned with the contentions and criticisms directed at the privately managed system, the NBS interface with the system, and issues pertinent to that interface. There are also policy questions, internal in nature, that need to be examined regardless of how broader policy issues are decided. There is, of course, some interplay between the decisions on external and internal matters.

4.3.1 Attitudes of NBS Participants in Standards Work

The traditional and the most common role of the NBS representative on a standards committee has been that of the impartial expert, there to supply scientific and engineering information to assure that the standard has a good scientific base and that test methods called out are adequate for the intended purpose. Half the respondents to the pertinent question on the internal staff survey selected the answer that their primary motivation in serving on a committee was to provide an unbiased opinion on technical

assistance (See Table 3.12, Chapter 3). There is ample evidence that NBS personnel playing this role have made valuable contributions.

Less frequently, the NBS participant has been an advocate of a point of view. In the case of non-product standards (terminology, definitions, symbols, etc.) some NBS scientists do have and express a point of view which may be increasingly based on special expertise but is not necessarily unbiased. As the subject matter becomes more product oriented, the NBS participant has usually tended to regard himself as the impartial third party serving as a technical resource.

Recently, and probably to only a small extent, NBS participants in standards making bodies have raised questions not limited to the technical adequacy of the base on which the standard is built, but additionally to matters of safety, and other social interests that may not have been adequately considered.

Typically, the scientist is comfortable in standards work where the relatively small technical uncertainties are identified and "truth" can be determined by experiment. He is increasingly restive as decisions become judgmental and arbitrary and "truth" is arrived at by discussion and negotiation and not verifiable in the laboratory. Some scientific activists of today, on the other hand, are willing to be cast in the advocate role in an adversary proceeding to arrive at "truth." Both they and the public suffer if their opinion as advocates is regarded as unbiased and completely objective. Because NBS is supposed to be regarded as the tower of objectivity and impartiality, only a few of its staff seem willing to play the activist role. Yet in some areas, perhaps including consumer protection, the circumstances seem to call for it.

4.3.2 Attitudes of NBS "Management" Toward Standards Work

Management of NBS at various levels has usually encouraged standards participation. In the case of the Computer Center, it is clear that the standards work is being done as part of the NBS responsibilities under the Brooks Bill (PL 89-480). The Office of Engineering Standards Services has a clearly assigned responsibility for VPS, and it calls on other Divisions for technical assistance from time to time. In the case of several technical Divisions and Sections, preparation of standards is regarded as a logical part of the mission and as a consequence, personnel

of these units are heavily involved in standards work. There are a few unit managers who regard work in Standards Committees as wasteful of time and an interference with the technical work.

Some participation in standards work has resulted from initiative at the Bureau and Institute Directors levels, often in response to requests for participation by organizations sponsoring standards preparation. These activities often involve policy or management positions in the sponsor organizations.

One adverse influence on standards committee work has been ceilings imposed on travel, both domestic and foreign. Unfortunately, sometimes a decision not to participate in the work of a standards committee has resulted from the lack of travel funds.

4.3.3 Attitudes of Outsiders Toward NBS Participation

Based on the opinion of those interviewed by the Panel, members of the Panel and NBS staff, it is clear that the NBS participant in a standards group is most commonly regarded as an unprejudiced, technically competent resource, a characterization which the participant appreciates. Even if a standard applies to products for which the government is a major purchaser, electronic products for instance, the NBS participant is so regarded although others representing DOD or NASA are not. On the other hand, in areas where NBS has been directed by Congress to undertake standards preparation, the NBS employee in related voluntary work may be regarded as an adversary.

It would be foolish to assume that all NBS participants perform perfectly in the voluntary standards arena. However, their average is sufficiently high that the opinion of the NBS "expert" carries great weight in decisions. Committees don't like to have an NBS negative vote in the record, and the solitary opposition of the NBS participant has often influenced the final form of a standard.

Another opinion expressed by our consultants was that the NBS participant ought also to be playing more of an activist role on the part of the consumer--defending the health, safety and general welfare of the public.

What is the proper role for NBS?

Which role will receive strong support from the private sector standards community? From consumers' representatives? From the

scientific and technical community? Can a role be found reasonably acceptable to all interested parties?

4.3.4 Setting of Priorities and Making Choices

A major problem regarding participation of NBS people on standards committees is how to decide what should be done and who should do it. The Office of Engineering Standards Liaison was established several years ago to develop guidelines and criteria for such decisions, to manage funding for travel to international standardization meetings, and to be the center of information covering engineering standards activities of the Bureau.

Can priorities or guidelines be developed for the type of standards activities in which NBS people should be involved?

How can NBS management assure itself that the best (or at least the most appropriate) people serve on standardization committees?

Should NBS make an active attempt to select and place NBS people on committees of its own choice?

Should NBS develop competences in those areas where there is an obvious need for technical support, but where insufficient NBS competence exists, for instance--consumers' products?

Is there a need for an NBS "Czar" or program manager for the Bureau's voluntary standardization activities? What is the best method for the NBS to participate in voluntary standards activities?

4.3.5 Systematic and Regular Review of Activities

A reasonable practice would be for the same level of management which authorized an activity to review it. In the case of standards work, a central overview would probably be extremely helpful. It is possible that if more knowledge of "who was doing what" were spread throughout the Bureau (and outside) valuable technical and political inputs would occur which are now lost. It is difficult to decide which standards activity should be undertaken if it is not known what has gone on and what is currently happening.

Would periodic review of NBS standards activity within the Divisions lead to higher quality of participation? Who should do it? Should there be reviews beyond the Divisions, Institutes or Centers? Should the review involve all standards activities? Should there be a Bureau-wide report of standards activities and progress for comments by other than committee members?

Should an NBS committee member review technical information with other affected government agencies? (This assumes that NBS knows who else is interested or affected by the standards and can act as an acceptable liaison).

Should NBS periodically publish a summary of its significant contributions to the development of voluntary standards?

Should there be an NBS imposed time limit on an NBS committee member's service on a committee?

4.3.6 Financial Management and Budget Identity

For NBS to develop a national policy for its participation in voluntary standardization it must know the costs. Once the total cost information is reasonably established, choices can be made between making funds available for such activities, or using them for other work. Although records are kept in some Divisions, reporting of time and costs are not now required and Bureau-wide data have been obtained only from special surveys. The question of the need for centralized accounting and control of funds for voluntary standards work must be raised, as well as that of requesting specific money allocation for this purpose from the Congress.

Should a central organization routinely collect data concerning costs involved in standards work (salary, travel, research, etc.), and have authority to require accountability from individuals?

Should costs of standards work be accounted for as a separate project?

Should there be a standard method at NBS of determining costs of standards-related activities of all types?

Should there be a central source and control of funds for domestic standards activity, as there is for the travel portion of international standards?

Should all standards committee work be centrally funded? The method of funding can exert control over the extent and nature of NBS participation.

Should funds or staff be made available to NBS members who assume chairmanship or secretariat for committees?

Should a special allocation of travel funds be made for this work?

Should NBS allow industry to pay travel expenses for NBS people to meetings? If so, under what circumstances?

Should there be different ways of handling funding for:

a. Committee work that relates directly to participant's activity at NBS?
b. Committee work resulting from other causes, such as participant's professional society affiliation, but not related to his NBS activity?

4.3.7 Attitudes Within NBS Toward Participation in Voluntary Standardization Activities

The attitude of a person's supervisor, Division, Institute, or Bureau management toward his involvement in standards committee work will often be a strong influence on the effectiveness of his participation. As indicated above such attitudes vary widely within NBS.

Should there be greater recognition of standardization activities, and if so, how can it be given?

How and to what extent should NBS deliberately encourage staff participation in domestic voluntary standards activities? In international standards activities?

What kinds of pressure are there and ought there to be from management, either to get involved or not, in standardization activities? What individual attitudes toward voluntary standards work ought management to foster?

4.3.8 Acquainting NBS Personnel With Voluntary Standardization Activities

If it is desired to increase the quality of NBS participation in standardization activities, more of the staff ought to know what is involved. Whether a large increase in numbers of participants would be good may be debatable; but it is certainly true that there are some highly competent scientists at NBS who do not participate. If the reason is lack of awareness of the importance attached to voluntary standards work or of the need for competent help in making such standards the impression ought to be corrected.

What can be done to acquaint NBS people with the nature, problems, and complexities of the work on standardization committees?

Should a standards committee participant have ready access to expertise elsewhere in NBS for comments on documents? How?

4.3.9 Policy Guidance for the Individual NBS Participant

As indicated by results of the survey and by some of the earlier sections of this Chapter, NBS participants are not always clear as to their status and responsibilities on standardization committees. When the questions about the NBS-system interface are answered, individual NBS participants ought to be instructed about the nature of their participation.

Should the NBS participant only act as a technical resource--or should he try to influence the work in other ways? (Various answers possible depending upon the milieu.)

Are there circumstances under which an NBS participant should not vote? What are they?

Should NBS participants be encouraged to seek leadership positions in standards activities?

Should NBS participants have an NBS understudy?

4.3.10 The Office for Engineering Standards Services

Chapter 8 is concerned with OESS, and elsewhere questions have been raised about the fate of VPS. Assuming that it is to be continued in OESS, some internal questions need resolutions. A few are listed here, but Chapter 8 deals with the problems more extensively. The revised VPS procedure gives DOC the authority to initiate standards which are "determined to be in the public interest."

How does NBS make the determination?

Could and should NBS use this authority to develop standards for consumers' products?

How can we assure that the VPS results will be used?

In addition to the continuing call from many others, the existing VPS procedures call for the development and incorporation of performance requirements wherever "technically sound, feasible, and practical."

Should NBS undertake a systematic study of existing standards, identifying possible needs for performance standards in lieu of design standards?

Some of the preceding discussion of the internal management of NBS participation in the privately managed system should apply to VPS as well. What it is doing ought to be a part of any standards information package. Technical consultants and participants in the work from NBS staff should be made available to VPS on the basis of an overall priority system. For the

purpose of internal management in other parts of NBS the VPS operation of OESS might be regarded as another voluntary standards operation, and treated accordingly. Presumably NBS has a direct concern in the adequacy of the VPS that are issued.

Should the work on VPS have some kind of priority on calls on NBS staff?

Should any NBS standards program managers that might be appointed have direct responsibility for OESS? VPS?

4.4 Summary

As stated in the Introduction, it is not the intent of this chapter to perform a review, nor is it intended to reach conclusions or make recommendations. Not all of the questions that could be asked have been listed here, some attempt having been made to identify those that were of greatest importance and needing prompt attention.

The obvious primary question is: "What should the ultimate goal of the Department of Commerce and the National Bureau of Standards be with respect to the system for preparing and promulgating engineering standards?" The choice could be to rely on the development of an adequate privately managed system and a consequent maximum support by DOC/NBS. Alternatively, it could be decided to work toward a government managed system, or some well defined objective lying between these extremes could be selected. If this choice is made, if the long range goal is clearly defined, many of the remaining questions can be resolved as a logical consequence.

Chapter 5
Bureau Policies and Objectives in Engineering Standards

5.1 Present Role of Bureau

It has been stated earlier that the Bureau's activities in voluntary engineering standards are not guided by explicit policies. In the main, the Bureau's objective appears to be: Serve as an objective, scientific and engineering group that stands ready to advise and contribute to the technical excellence of standards. The general direction of activities is responsive to technical interests rather than to the utility of the standards, and to traditional participation rather than to selective participation based on deliberate preferences. There are departures from this--among them, the Computer Center's implementation of the responsibilities deriving from the Brooks Bill whereby the Bureau acts as a consumer representative for information processing equipment; the Office of Engineering Standards Services' roles as standards information center and manager of the Voluntary Product Standards program; and occasional efforts to direct the participation towards the development of specific standards that serve public needs. For the main objective, there are many interpretations as to the relative priority engineering standards activities should take with respect to other Bureau activities. The departures from the main theme and the many variations on the interpretation of the theme create a situation in which policy is determined by what each individual does, perhaps inconsistent with the desired, but unstated, objectives. Even worse, responsive and imaginative actions may not be taken due to perceived differences in policies.

The Panel believes that the need for clarification of the Bureau's roles and responsibilities in voluntary engineering standards, the lack of operationally interpretable objectives, are the principal sources of many of the problems and questions that have created the need for this Study. This is not to say that the present activities are inappropriate or that the Bureau must decide on a single objective. The point is, clarification of the issues requires a clarification of objectives. For example, there is a question of which technical committees Bureau personnel might serve. If the purpose is support of technical committees to assure technical excellence, then there may not be a need to participate if there is adequate competence already in the committee. If the purpose is to gain technical information, one could select committees with competent representation and avoid those without. If the purpose is to arbitrate differences, one could select committees likely to become deadlocked. Again, if the purpose is to quickly develop a much

needed standard, there may be benefit to having many Bureau representatives in a single committee. If the purpose is to emphasize socially needed standards, technical committees that do not generate such standards should be avoided even though there may be a need for Bureau technical competence. As another kind of example, contentions about the voluntary standardization system are only a concern of the Bureau to the extent that the Bureau is concerned about the strength and viability of the voluntary standardization system. If the Bureau considers itself to be principally a technical support agency, then contentions such as the lack of consumer product standards should not be of great concern. However, if availability of public interest standards is an objective, then the deficiencies in the development of consumer standards might be cause for action.

We now explore the Bureau's role or roles in engineering standards, examining the arguments for and against each of three distinctive objectives. The managerial problems associated with these objectives will be treated in the next chapter. It will be noted that we have often raised questions without answers to them or have given only partial answers where we have felt that the questions were important to the issue.

5.2 Options for Bureau Objectives

We distinguish three objectives that the Bureau might adopt, or goals that the Bureau might seek:

a. Seek identity as the Government agency responsible for an effective and viable system for developing voluntary engineering standards.

b. Seek identity as the Government agency responsible for the availability and adequacy of standards for groups that are not adequately represented in the voluntary standardization process.

c. Seek identity as the technical resource, the think tank, and research support to the standardization system.

The Bureau can, and now does, engage in all of these with varying degrees of emphasis. Each can be implemented in various ways and at different levels with different problems and consequences. These detailed considerations will now be discussed at length.

5.3 Some Preliminary Topics

Before proceeding with the examination of the options and (a) how strongly the Bureau might field each responsibility, (b) what aspect or portion of the system the responsibility might cover, and (c) how this might be implemented, certain topics and questions which we believe are pertinent will be treated.

5.3.1 Engineering Standards and the Public Interest

The main reason for an industrial or commercial firm to develop and use standards is due to the savings that are made possible. The National Aerospace Standard 1524 prescribes a standard format for the identification and calculation of savings to a firm resulting from the use of standards. It identifies 52 factors to be considered, partitioned into seven categories of savings. Under Engineering, it lists such factors as "Reduce technical time in processing product design," "Reuse of known items improves reliability and reduces debugging," "Reduce 'break-in' time for new technical personnel," "Improve interchangeability of parts, designs, packages, test fixture, etc.," and "Develop cost estimates more economically." Under Procurement, it lists "Increase purchasing power through procurement of larger quantities of fewer items," "Reduce lead time," "Provide common language between buyer and seller reducing time required for negotiations," and "Put all suppliers on a fair competitive basis." Although the list does not mention it directly, a substantial benefit of standards in procurement is that a standard is a substitute for the preparation of detailed purchase specifications. In the absence of a specification already validated, a purchaser may have to go to considerable expense involving the use of technically sophisticated manpower to prepare a valid and safe purchase specification. On the other hand, a well validated standard can simply be referenced by number in lieu of that purchase specification. It lists further savings under Quality Control, Inventories, Production, Maintenance, and General. Most of the factors that are identified affect the firm directly and result in costs savings that accrue to the firm. Such savings are not usually treated as contributing to the public interest; however, reduction in waste and the increase in the efficiency of each firm benefits society in the form of conservation of resources, more consistent if not improved quality of products and services, more viable enterprises, and by the manner in which the savings are utilized, such as lower prices, higher dividends, higher wages and salaries, etc.

Standards for dimensions permit interchangeability and are the basis for specialization and mass production, which not only leads to efficiency within a firm, but also provides enterprise and competitive opportunities. Recalling the period when railroads operated on different track sizes necessitating transfer of cargo from one railroad line to another or the hand crafting of each automobile, it is clear that standards have contributed significantly to the general welfare.

Standards for safety for consumer products and industrial equipments and practices affect the public interest in a direct manner in that a significant number of individuals can be affected by the standard, either served by the standard if it is adequate or be exposed to unnecessary hazards if the standard is not adequate. A standard that limits and fixes variety can benefit industry and commerce by inventory and production savings, but the private citizen can also benefit if the standard applies to a product for household use. Quality standards for consumer products, of course, affect the private citizen purchasers directly.

Standards of all types generally benefit society and hence are in the public interest although the manner in which the benefits accrue will cause the amount of benefit to vary greatly.

There are, however, negative aspects to standards. A safety standard which prescribes a high level of protection will generally result in a more costly product than a standard with less protection. A careful person may not require the additional built-in protection and thus pays for a feature he does not need. If the standard is too stringent, with a resulting high product cost, the users may seek non-complying substitutes which are more hazardous than the product would have been even at a lower protective level. A safety standard which is too permissive may not only fail to protect, but may imply protection, provide undue confidence, and lead to unnecessary risks and consequent harm. Standards can be written or used in manners which restrict innovation or give selected firms or industries undue advantages and thereby limit competition. Standards which restrictively specify which materials may be used in a product are recognized to be of this type while standards which specify the performance requirements of the materials are recognized to enhance technological innovation and competitive opportunities.

Standards which limit variety may result in savings in production, storage, and distribution, but they may also unduly restrict consumer choice and thereby diminish the aggregate benefit resulting from the standards. If the restriction in choice is too great, the net result may be more damaging than

good. To take an extreme example, if only one model and size automobile were manufactured, the efficiency of production would undoubtedly be very high. On the other hand, the satisfaction with this product would probably be less than if more variety of models and sizes were offered.

Inadequate technical specifications may negate otherwise beneficial features. For example, standardization based on an inadequate test method may result in misrepresentation of a product property with subsequent harm. If there is not a reasonably simple and valid test method specified for determining conformance with a standard, then the utility of the standard is diminished. This also applies to federal, state, or local government standards for promulgation of mandatory protection of health and safety. Its legal credibility and, therefore, effectiveness may be nullified if the standard does not specify a valid test method.

These examples illustrate the variety of ways in which standards affect the public interest. A standard dealing with automobile performance or safety potentially affects a large number of individuals directly while a standard dealing with test methods on procurement item, such as on coal, may be part of the general standards program that enhances the efficiency of the firm, leading to lower prices and affecting a large number of individuals, but less directly. A standard specifying lower sulfur content of coal would affect the public interest in another, perhaps more significant way. If, however, the standard (and others like it), should lead to a sizable price increase in automobiles, the public interest is affected in another way. The resolution of such conflicts is often involved in deciding which course is in the best public interest. This suggests that the development of a "good" standard is often a complicated process encompassing economic, social, and political considerations as well as technical questions.

Since standards can affect the public interest in so many ways through so many activities, the problem of Government standardization activities is mainly one of priorities and obviously an exceedingly complex one. There are many criteria which are not easily comparable and there are serious problems of obtaining data even among measurable and comparable criteria. The trade-off between protection level and product cost was cited as a problem for a single standard. There are similar trade-off problems between classes of standards, e.g., between product safety standards and standards that result in efficient operations of firms; standards which limit variety of products which may have relatively calculable savings versus standards of definition, whose effects are not easily determined. There are standards

which may directly affect many people with relatively small marginal effect, e.g., a slight change in allowable current leakage in home appliances, as against standards which affect relatively few individuals, but with significant effects, e.g., mine operation standards. Standards which permit technological innovation by specifying performance requirements may, in the long run, contribute much more to the public welfare than standards which seek incremental improvements in the efficiency of existing operations although in the short run the reverse may be true, leading to long run-short run trade-off problems.

Clearly, the choice among standardization activities is difficult and even the definitions of the relevant criteria are not easily made. The criteria should include:

1. An indicator of the number of individuals affected by the standard. The "directness" of the impacts is a problem since some standards directly affect the ultimate consumer while others affect the same number of people, but indirectly. For example, a tire grading standard would directly affect all tire purchases in the sense that the standard will be specified in each transaction, while a test standard to establish grade of rubber affects each tire, but is not directly involved in the consumer transaction.
2. An indicator of the aggregate value of the item to which the standard applies. This is a materials counterpart of the people in (1). That is, for a product test method, the number of people may be irrelevant, but the total value of transaction of the material in which the standard is specified seems relevant. The number of transactions and number of firms are elements of this.
3. The indicators of effect resulting from the standard to be applied to (1) or (2). The indicator can be economic -- such as savings by reducing production cost, increase in consumer's real income, etc.; physical -- such as kinds of accidents prevented, including severity and reduction in frequency of their occurrences; and cost of applying the standard.

There are many nonquantifiable effects of standards which cannot be ignored, such as "peace of mind" and "greater equity among competitors," better communication, and others which contribute to the quality of life and thus serve the public interest.

Distinct from the criteria of whether a standard may be in the public interest and to what extent, we distinguish a class of standards because of industry domination of the voluntary process of standards development. For the lack of a better term, we identify as Social Need standards those standards which lack adequate support and championship in the voluntary standardization process and hence are not promulgated to the extent desired. In general, Social Need standards more or less directly affect the welfare of household consumers, small businesses, local governments, industrial employees, developing industries, private citizens, and others not adequately represented in the standards making process. Thus, consumer product standards, safety standards, and standards which become embodied in codes and regulations are encompassed within Social Need standards. Industrial standards which could contain specifications which protect against environmental pollutions or hazards are also Social Need standards since those affected by the pollutions and hazards may not be represented to protect their interests.

There are strong reasons for distinguishing this class of standards. Traditionally, the Federal Government has acted to protect the part of the public and that segment of industry and commerce that are the principal beneficiaries of the social need standards. Since these groups are not adequately represented in the voluntary standardization process, the Federal Government might have a role in promoting (and perhaps participating in) the development of this class of standards. All standardization committees are concerned to some degree with Social Need standards, and should increasingly recognize the need to consider such things as the pollution arising from disposal of materials into solid waste, combustion products, and so on. NBS staff members should be alert to Social Need aspects of all standards.

5.3.2 Importance of Engineering Standards and the Voluntary Standardization System.

If organized standards did not exist, there undoubtedly would be chaos and great inefficiencies in industry and commerce; or perhaps more conservatively, without engineering standards, the level of economic achievements would be much lower than we know it now. The significance of voluntary engineering standards is illustrated by the fact that 391 industry standards

related to the design and manufacture of home television sets were identified. Of the 391 standards, 38 are IEEE, 143 are ASTM, 156 are EIA, and 54 are ANSI standards (mostly based on EIA and ASTM standards). In addition to these, the materials purchase specification manual for a major television manufacturer lists 146 standards and specifications--40 Mil. Std., 27 Federal Specs., 8 AIAA, 3 DOC VPS, 2 NEMA, and 66 ASTM (not included in the 143 cited earlier) standards. (The standards are listed in Appendix D). There may be some outdated, but the list does not include others, such as for cabinet work, etc. Thus, there are well over 500 standards related to a home TV receiver. Many individual standards may be insignificant, but the lack of these as an aggregate would severely hamper the design and manufacture of TV sets. It is evident that some system for developing engineering standards is an essential part of the efficient operation of the economic system. In the U.S. the bulk of engineering standards used in the private sector are developed through private organizations on a voluntary basis. The magnitude of this activity indicates that the private voluntary system must continue to provide for the bulk of engineering standards.

Granting the general importance of standards and the system for developing them, the use of standards is not universal nor are the needs acknowledged. The nature of the economic system imposes different requirements for standards. In centrally controlled, industrialized economy, standards of all kinds play an extremely important part in the general scheme. The adequacy of the standards may be the controlling aspect of the efficiency of the economy. In a free enterprise economy with voluntary use of standards, the expressed need for standards are far less. The essence of free enterprise is free entry into the marketplace with products and services that might have greater demand than what has been available, implying that the newly offered product or service is different in some respect. It is also a basic feature of free enterprise that once one has created a market, he does not want a competitor to encroach upon it, at least easily. Thus, standards are in one sense somewhat antithetical to a free enterprise system. A competitive situation at one time developed more than 200 masonry sizes and there are many examples of excessive variety in use today. However, the greater use of standards generally results in greater efficiency and there are also counteracting reasons for the use of standards. Thus, even competitors find it advantageous to adopt common standards for certain items, not to act in restraint in trade (necessarily), but for increased efficiency in their activities. Of course a case can be made that standards foster competition, for, through their role as ready-made purchase specifications, they promote competition among subcontractors for materials and component supplies. A new enterprise trying to invade a market has in the extant

product standards an objective description of the design and performance specifications that are necessary, perhaps even sufficient, for him to succeed by offering a complying product at a competitive market price. It may be argued that because of the greater resistance to materials specification and design standards in a competitive society, the existence of a strong performance standard developing system is even more important than in a controlled economy.

5.3.3 The National Standard Organization

In all countries with requirements for engineering standards, there is a central organization that promulgates standards that are designated as "National Standards." In the U.S. this organization is ANSI, in Britain, BSI, etc. There are many functions that should be served by a National Standard and by the process or organization promulgating them. It should provide uniqueness. Obviously, if several standards purporting to represent the same item, process, or concept are in active use, the benefit of the standards is diminished. It should provide confidence through the integrity and competence of the organization and its procedures. It should provide convenience by maintaining a single source from which requirements can be determined. It should be responsive to the standards needs of all economic sectors, and it should contribute towards greater efficiency of the entire system. All of these characteristics are not inherent in a National Standards process, i.e., the existence of a central standards organization promulgating National Standards does not imply that their standards and operations have these desirable characteristics. All industrialized countries apparently feel that some form of a central organization is the way to attain a desirable standards system.

In the U.S., ANSI is considered to be the central standardization body, but the recognition is unofficial except for participation in IEC and ISO activities. There are many organizations in the U.S. that develop standards that are nationally used, but are not identified as National Standards. Only a few organizations, however, produce standards in significant quantities. This situation poses a problem in the issue of involvement of the Federal Government and the Bureau in the voluntary system, particularly if the policy is to be one of active concern for the viability and effectiveness of the system. The problem arises from the need to consider more seriously the options for the manner in which the policy might be implemented. The basic options are whether to emphasize the position of the National Standards process or to treat all organizations as contributors to the system. The Dingell Bill, an example of an extreme position for the Federal

Government, would take the latter course. This Bill would, in a sense, make only standards passing the Government reviews "National Standards" since ANSI promulgated standards would be afforded no different treatment than any others. For a milder government position, the strengthening of ANSI is an alternative approach. An intermediate position would provide direct federal involvement in ANSI under a Congressionally established charter. This study does not evaluate this position. Those who doubt the superiority of the Federal Government's capability to process acceptable standards or the willingness of Congress to finance a system now costing the private sector $100 million per annum would argue that a less intrusive role for government would be more effective as well.

5.3.4 Grounds for Federal Government Concern for Standardization System.

The importance of voluntary standards to the efficient operation of the economic system provides the basic ground for concern. There are three aspects of the voluntary system which are of concern, (1) that the system remain viable; (2) coverage, i.e., availability of standards for all important economic sectors; and (3) adequacy of standards. Concern for viability stems directly from the general importance of standards. It is likely that standards are of sufficient importance so that private enterprise would maintain a system for developing standards for its own needs without government support. However, industry standards advocates state that there is insufficient recognition of the value of standardization among industry's top level executives to properly support the standardization system to meet all of industry's needs. A system that meets industry needs will not necessarily be a good one from the total economic and social point of view, encouraging innovation, taking into account consumers and environment, fostering fair competition, and adequately protecting the citizenry from hazards of product use.

Coverage and availability are of concern since the lack of standards to significant economic segments deprives these segments of the opportunity for efficiency and equity. This concern arises from its two roles, the government itself is (1) a large consumer and hence has its own needs for standards and (2) advocate for the availability of standards to all important segments of the economy. Although the government supposedly always acts in the public interest, there can be wide differences between the government's requirements for its own operations and the public's requirements for its activities. Hence, it does not follow that developing standards that fill the needs of DOD, GSA, NASA, VA, etc., will also fill the standards needs for the public, or vice versa, although there are some overlaps. This dual

interest poses a special problem to the Bureau in terms of the Bureau as the Federal Government's liaison with the standardization system. Should the Bureau attempt to represent the government as a major consumer and its standards needs in policy deliberations within ANSI and other organizations? Or should the Bureau take the position of the general standards system advocate and let DOD, GSA, and other agencies with procurement and regulatory needs for voluntary standards seek their own representation. Even if the Bureau could represent the needs of other Government agencies, there could be a conflict of interests, for example, in the priority between satisfying the Government's own requirements and the public's requirements. The Bureau's responsibility for the implementation of the Brooks Bill puts the Bureau in the role of safeguarding the Government's interests as a major consumer of information processing equipment. Alternatively one might argue that the government should act as a consumer in such a way as to foster national interest even at the penalty of higher cost for government operations. The standardization problems related to this are being covered by the Computer Center Issue study and will not be treated here.

The dearth of standards in the field of industrial safety is reported in the 1968 review of USASI safety standards by the Department of Labor (Status of Safety Standards. U.S. Department of Labor, 1968) .."shows: Nearly 60 percent of these consensus standards are five or more years old -- the largest percentage 10 years-plus," and "at least 50 areas where national standards either do not exist or are inadequate." The President's Commission on Product Safety has reported on the deficiency of both number and quality of existing consumer product safety standards. The 1970 ANSI catalog lists approximately 200 consumer product standards, many of which are of limited use to most household consumers. Redress in these areas represents a major action area.

Since individual standards can be self-serving and may unduly restrict or disadvantage legitimate enterprise and may mislead with respect to expectations concerning health and safety of the public, the assessment of adequacy of the content of certain standards is grounds for governmental responsibility. The use of individual standards as they serve to restrict competition are covered by antitrust and restraint of trade legislation and we shall not pursue this. Safety standards that affect public interests are of direct concern although there may not be a legislative mandate; similarly the federal government has a responsibility for standards that become components of codes promulgated by local governmental units. Responsibility for safety standards is clear. Standards that become parts of codes become

mandatory even though they may have been developed through a voluntary process, and therefore have special significance for adequacy when they are being developed.

5.3.5 Federal Government Involvement in the Private Voluntary Standardization System

The private standards developing organizations, ANSI, ASTM, SAE, etc., have generally welcomed technical participation by government personnel and ANSI has encouraged financial support from government agencies as members of the Institute. Government agencies were members of ASA until 1948 when ASA became chartered in New York. All government agencies then dropped their memberships. There is no legislative restriction to governmental membership in ANSI; however, no Federal agency has yet joined ANSI as a member. Although private organizations have sought technical support from the government (financial support by ANSI), there may be great resistance to government involvement which they may feel would lead to control.

There are precedents for Federal government involvement in the standardization system, especially in the national standards process. Important examples are the establishment of ASA through the Bureau's early standards activities, the close working relationship between ASA and the Bureau, and the convening of the LaQue Committee by the Department of Commerce. The active participation of government scientists and engineers in the technical committees of many standards-developing organizations is also a contribution to the viability of the system. The extent of Bureau participation in the voluntary standards organizations has been described in Chapter 3. Besides the technical committee activities of staff members, the NBS Director is an ex officio member of the Executive Standards Board of ANSI and other Bureau officials have been or are members of policymaking units in ASTM, UL, and other standards organizations. The influence that these officials can and should exert on major policy matters has not been thoroughly examined. A later section will consider this question briefly. Although an industry group convened to advise the Secretary of Commerce, there is no question, however, that the LaQue committee had a major influence on the American Standards Association.

5.3.6 Effectiveness of the Voluntary System

The criteria for the effectiveness of the standardization system are basically: need, availability, usage, and the consequences of use. Information on availability of standards by numbers and by categories can be determined,

but information on need for and usage of standards is not available at all. The consequences of use are available only in general terms. Hard data are possible for standards that limit variety and safety standards, but are not reported in the literature.

The number of standards promulgated is an indication of activity but clearly not a measure of effectiveness except insofar as very low activity may imply ineffectiveness. The assessment of needs is not a simple problem, especially for the needs of individuals and small consumer groups since these consumers are rarely explicit in their needs. Also, even if useful standards are available, small groups of consumers may not be able to utilize them in the sense of creating sufficient demand to convince manufacturers to produce to the standards at acceptable prices. Furthermore, the consumer's needs are not for standards per se, but for getting his money's worth. Standards are one way of achieving this. If other methods can accomplish the objective, then, of course, the need for standards diminishes. There are no data on the extent of use of standards in terms of value of transactions, frequency of citation, or other measures but undoubtedly the usage of individual standards varies widely.

One measure of the effectiveness of the National Standards process (ANSI) is the cooperation it obtains from the other standards-developing organizations. Table 2.2 shows the number of standards submitted to ANSI by other contributing organizations. There appears to be excellent cooperation among ASTM, UL, and ANSI. Table 2.2 shows that a large part of the American National Standards are either ANSI or ASTM developed standards. The list is significant by the limited number of organizations submitting standards to ANSI and by the small proportion of standards submitted by such organizations as SAE.

The question of what standards should be designated as National Standards is a difficult one to answer, but it would seem that standards promulgated by SAE, ASME, and similar organizations have as much claim to national recognition as UL and ASTM developed standards. By this criterion, it appears that ANSI is not receiving as much recognition (not as effective) as it might obtain. Changes in the rates at which other organizations submit candidate standards to ANSI might serve as a rough indicator of the perceived credibility of ANSI.

There have been strong charges made that the voluntary standardization system is not responsive to the needs for adequate safety standards in both industrial and consumer equipments and products and for the performance and durability standards requirements for consumer products. It is even charged

that the voluntary system cannot adequately serve these needs. Lack of adequate safety standards, especially, is a reflection on industry and on the apathy of the general public; however, it poses a special problem to the government's concern with the voluntary system.

Other contentions about deficiencies in the voluntary system have been described in Chapter 4. Perhaps the most significant of those is the difficulties faced by new industries, particularly those developing new materials, in changing existing standards to permit the entry of their products.

5.4 Responsibility for an Effective and Viable Standardization System

5.4.1 NBS roles

NBS is unique among governmental agencies having interests in standards because of its predominant position as a standards advocate rather than as a user of standards. The Bureau is the logical agency to be the Federal government's liaison with the voluntary standardization system and, with the Department, to field the responsibility for a viable and effective standards system. There are no prescribed positions on this matter and so there are many optional roles. Although some are infeasible without legislation and apparently unwarranted at the present time, we shall mention them. There are two distinct options: (a) to assist and encourage the private system, principally ANSI and the major standards organizations contributing to the National Standards process, and (b) to attempt to develop a more effective system through greater government control.

(a) Working with the private system

The two extreme positions in this role are (1) passive, that is, render assistance as requested or when standards organization faces serious problems and (2) active, that is, participate in policy formulation, render financial support, evaluate system performance, encourage the use of standards and support of standardization, encourage industry to take more responsible attitudes towards Social Need standards, etc.

The Bureau's current position is somewhere in between the two, perhaps closer to the passive end. An active role might involve working closely with the private organizations to develop ways to meet important issues such as adequate safety standards, consumer product standards, disadvantages faced by innovative products, and improving the acceptability of the National Standard.

Actions may possibly be taken by sponsoring conferences, through ANSI Boards, more speeches by Bureau and Commerce officials, etc. A problem that arises from more active participation is the need for more thorough and independent assessment of the difficulties and shortcomings of the private system. There are many contentions and the economic and social issues with which standards are involved are very complex. Unfortunately, pertinent data and information are difficult to obtain in this area.

ANSI claims that its principal problem is lack of financial support, mainly in its international standards activities and as a means for obtaining greater consumer-interest representatives into its technical committees. Significant financial support would have to be appropriated by Congress if substantially greater industrial support is not forthcoming. Whether Congress is inclined to support this is a question mark. Dr. Astin's belief was that Congress would not. The key issue is: Would the Standards groups and private industry wholeheartedly solicit this support?

If the Bureau becomes a dues paying member of ANSI, there is a possibility that NBS's position in ANSI policy matters would be enhanced, therefore enabling a more direct working relationship. There would most likely be a "bandwagon" effect if NBS becomes a dues paying member of ANSI as other U.S. government agencies would follow. This would add considerable strength and funds to ANSI's position. There is the danger that excessively large government membership in ANSI would lessen industry's financial support of ANSI but this is unlikely. Of course, there is also the possibility that by becoming a dues paying member of ANSI, NBS will become "just another member" and actually suffer a decreased influence in policy matters. This, again, is unlikely. A problem that is likely to emerge with NBS becoming a dues paying member of ANSI is one of drawing the line on NBS memberships in other standardization organizations and other technical societies.

The advantage of working with the private, voluntary system is that it provides the bulk of engineering standards that are used by the industrial and commercial sectors. If its shortcomings can be eliminated, this will be most widely acceptable and economical to the government. Without legislation it is of course the only practicable method. The disadvantage of taking a strong and rigid position on this is that the private voluntary system may be inherently incapable of developing certain types of standards that are needed for the public interest and thus there will be a time delay before these needs are fulfilled.

The technical support activities can be provided with either a passive or active role in regards to system policy matters. The resource allocation problems and options will be treated in Section 5.5.

(b) Gain greater government control of the standardization system. Legislation proposed by Representatives Dingell and Rosenthal would provide for three-way reviews of all standards used in interstate commerce. Justice would review for antitrust and restraint of trade, HEW would review for health and safety, and NBS would review for technical adequacy. Such proposals indicate that there are proponents for extensive government control over the final review and approval of National Standards. In many countries, there is at least some government involvement in the standards to be designated as National Standards.

Perhaps one of the mildest forms of government control is the formation of a Federally chartered National Standards organization with partial financial support from the government and with government representatives on the board of directors, similar to the proposed Standards Council of Canada. This sort of arrangement could have many advantages towards the development of an effective standardization system:

(1) Since financial support need not come completely from the private sector, the quasi-public organization can take a more public-spirited stand on standardization. This should lead to serving the important sectors with needed standards. If the organization does not take a public-spirited stand, the benefit of being a quasi-public charter is lost.

(2) An effective voluntary standards program requires that there be demand for standards on the part of the product users so that standards are part of the description of a transaction. The government association and proper procedures can provide the prestige and credibility required for active use and demand for national standards. A completely government-controlled standardization would not work in a voluntary use system, while elimination of the voluntary use feature would completely alter the U.S. economic system and is both infeasible and undesirable.

(3) The preferred mode of operation for governments of all levels in the United States is to base regulatory requirements on voluntary standards when the voluntary standards are adequate. The quasi-public organization might facilitate the interfacing between the voluntary system and the regulatory needs of federal, state, and local governments.

(4) Satisfying industry requirements for standards need not be hampered in any way by a quasi-public organization. Better coordination among standards-setting organizations could lead to more productive standardization activities and to more consistency among standards.

There are many arrangements that NBS could have with the quasi-public standards body. A reasonable one would be a close association wherein NBS would assist the standards body with technical support -- research, review, and advisory -- and participate in its policy deliberations as part of the government representation on the Policy Board. This would provide the organization with needed technical assistance and the quasi-public nature of the organization should facilitate close liaison between the two organizations and would be a "comfortable" relationship between NBS and the quasi-public body.

A quasi-public national standards organization has often been mentioned in the past. It was also a principal recommendation of the LaQue Panel. The apparent lack of support for this in previous years indicates either indifference or the fear of too great a government involvement in the voluntary system. Whether the problems and difficulties of the present system will now lead to support for a quasi-public organization is a question.

Stronger forms of governmental controls are illustrated by the standardization systems in other countries with the French and the Russian systems as two other distinctive points on the spectrum of control. These stronger governmental roles are unlikely in the United States for the engineering standardization system as a whole and so will not be pursued here. However, it is entirely possible, perhaps even probable, that stronger governmental control on certain social need standards will be imposed. Whether this will significantly alter the voluntary standards system remains to be seen.

5.4.2 The NBS Voluntary Product Standards Program and the Private Standards System.

The Bureau's Voluntary Product Standards (VPS) program will be discussed in Chapter 8. At this point, we consider only its relationship to the private voluntary engineering standards system. The VPS program offers its services to the development of standards when they cannot be processed according to the needs or desires of the industry within the private voluntary standards system. The assurance of "cannot be processed" comes from the potential sponsor. Ostensibly, it is not competitive with the other standards-developing organizations, but standards for horticultural grade perlite (PS 23-70), school chalk (PS 30-70), and polystyrene plastic sheet (PS 31-70) indicate that the criterion for eligibility is loosely applied. There is a need for more specific, procedural criteria for evaluating eligibility.

Some view the VPS program as a potential threat to the private National Standards process; others see it as a stimulus and model. Although the VPS program is now almost insignificant in terms of number of standards, its advantageous position within the government is considered by some as posing a competing or another "National Standards" process and thus a threat to an important part of the private standardization system. One way of removing this concern is to submit Voluntary Product Standards to ANSI to be part of the American National Standards and thus demonstrate that the VPS program serves to fill a gap within the voluntary system. Two arguments, however, are raised in opposition to this proposal. There may be objection to submission of a Federal action to private approval. More fundamentally, if the DOC Voluntary Product Standards are to serve as a "safety valve" in the event private sector standards bodies are deadlocked, then standards cannot be subject to negation by the very bodies whose procedures the Federal standard has bypassed. If Voluntary Product Standards are not submitted, this implied criticism may stimulate private bodies to change their procedures, but also casts doubt on the existing National Standards concept. This question also requires resolution, especially if the Bureau is to participate actively in the private voluntary standards program.

5.5 Responsibility for the Availability and Adequacy of Social Need Standards

In this general role, NBS would seek identity and responsibility for the availability and adequacy of standards that lack adequate support and championship in the voluntary standardization process and hence are not promulgated to the extent desired (Social Need Standards Advocate). This would include insuring adequate coverage and quality, by either inducing the existing system to produce them or by having them produced by other means. Examples of the types of standards included in this category were given earlier in this chapter.

Although there are other beneficiaries of social need standards besides the household consumer, consumer needs will undoubtedly be a dominant responsibility of a social need standards advocate. While standards play an important function in facilitating industrial transactions, the household consumer has no comparable mechanism. An industrial firm may write detailed purchase specifications using established standards to help in writing the specifications. The household purchaser is the only purchaser in the system who does not have even the possibility of writing a purchase specification for most of his needs. The "play of the marketplace" is usually mentioned as the consumers' leverage on the market and unquestionably, manufacturers attempt to satisfy demand. Although the "play of the marketplace" may weed out clearly inferior products, mediocre products can flourish, not because there is such great demand for the mediocre product, but because that is all that is offered to the consumer or because the consumer cannot evaluate the product's efficacy (e.g., battery and motor oil additives). The responsibility of a consumer standard advocate should be to help the comsumer have the benefit of a set of virtual purchase specifications for his needs.

5.5.1 Possible NBS Roles as Social Need Standards Advocate

a. Policy guidance and financial support for the private system. There have been complaints from consumer advocates and government regulatory agencies that the private system has not developed proper and adequate social need standards, particularly types 3 and 4 (retail market product standards and obligatory standards). The largest and most representative organizations capable of producing such standards are ASTM and ANSI. Since their financial support derives almost entirely from industries and trade associations, the emphasis has naturally been on development of type 2 standards (industrial market product).

One possible way of improving the situation would be to influence the private system at appropriate policy levels in an attempt to induce more activity on social need standards. NBS has been in a position for many years where policy guidance was possible at various levels but has not substantially influenced the system. This may have been because of the lack of a concerted effort, perhaps due in part to lack of confidence in the support of the Department at the policy level. The lack of influence may also be due in part to lack of financial leverage.

If financial dependence on industry is the principal basis for inability of standards organizations to support the development of Social Need standards, then government policy influence may depend upon financial support at the same time. The most direct way of providing financial support for the private system would be to become a dues-paying member of the various organizations producing Social Need standards. Although the amount paid by an individual agency such as NBS would be relatively small, total government support could become significant if other agencies followed the example set by the Bureau.

In any consideration of government financial support for the private system, it must be remembered that general, unspecified support could conceivably have a detrimental effect if the amount were too large. If large amounts of money were given to ANSI, for example, for general support of all operations, industry might reduce its current support on the grounds that it would then be paying twice--once as a private industry and again through the government as a taxpayer. This tendency for reduced industry support might not be as great, however, if any government support were specified for use only in developing social need standards. A necessary and quite reasonable use of the funds would be to cover the expenses of consumer or general interest representatives who would serve on committees producing appropriate standards.

It is difficult to assess the extent to which the private standardization system will respond to the development of social need standards even with financial support and active NBS participation on the policy level. The LaQue Panel recommended greater concern for consumer standards, but without much effect. Activity in the development of safety standards has been substantially dependent upon the threat of mandatory action by Congress. Nevertheless, it appears that response will not be forthcoming without financial support and government urgings at policy levels. It is possible that with some government financial support, a strong national standards

program, active public relations, and education of the public to demand recognized standards, headway can be made.

b. Technical committee participation, chairmanship, and sponsorship. A possible NBS role would be to concentrate on, or even limit involvement to participation on technical committees that produce social need standards. To increase the sphere of influence, involvements could be expanded in the seeking of appropriate committee chairmanships and sponsorships. This would require a statement of policy and some means of financing. The latter could be handled by curtailment of non-social need committee activity or by increased appropriation from Congress. In effect, the Bureau would be a stronger advocate of social need standards, via the technical committee route, within existing legislation.

The June 1970 OESL listing of technical committee participation includes NBS representation on (about) 35 committees dealing with safety or safety-related subjects (two examples of safety-related committees are: ANSI A13, Identification of Piping System and ANSI Z53, Safety Color Code). The chairmen of two of these committees and a representative on the ANSI Safety Standards Board are NBS staff members. There are relatively few committees dealing with standards for consumer products, per se, although many standards affect goods and services utilized by household consumers. NBS is represented on about ten committees dealing relatively directly with consumer products. A rough estimate would be that NBS currently is represented on about 50 technical committees concerned with social need standards.

Participation on a standards committee as a social need advocate differs considerably from participation as a technical expert. Since most NBS staff members participate as technical experts, an extensive program of instruction for present and future committee participation would be required, including information on what the social need is, how it can best be served, how to compromise and arbitrate various other interests, and related topics.

c. Review of proposed standards submitted voluntarily. NBS could actively seek changes in the policies and practices of standards bodies so that all future social need standards would be submitted voluntarily to NBS for review before publication. If such a standard passed review, it would have an NBS blessing signifying general worth to the public and no special advantage to vested interests. Such an NBS role could conceivably gain acceptance by the public and the standards bodies--to the former because

the Bureau has a reputation for integrity, to the latter because there is a real threat that such a role may become mandatory in the future if the system fails to improve itself.

Some feel that the Bureau's proper role is that of review, that committee participation cannot be as effective because the NBS representative can easily be outvoted by the other members. To perform the review function properly in the broad interest of social need, new elements of expertise would be required. But a relatively small staff in additional areas of competence, combined with technical input from staff members on hand, could process a significant number of standards. In fact, it might be advisable to discontinue representation on technical committees if the review role were assumed, and divert the manpower to the review function instead. Creating a quasi-public body to accomplish this review would probably be necessary, in which case NBS could reconsider the role of its staff, choosing between standards writing and review.

The effect of a review procedure is not clear. If the review involved determination of overall quality, adequacy, and appropriateness, and with full industry cooperation, the value of the review could be considerable. If, however, the review were only technical (e.g., measurement methods), it would have very little social impact. Also, the process of voluntary review and with no further authority beyond review may mean that poor standards are not submitted for review and that standards that are not acceptable to NBS may not be revised so that a standard is never issued. In certain cases, a heavily compromised standard may be much better than no standard at all. On the other hand, product identity with a government-reviewed standard may create greater demand for the product and, in turn, the services of an NBS review.

d. In-House development of social need standards. If it could be concluded that the private voluntary standards system is incapable of producing adequate social need standards, (and sufficient evidence to this effect may indeed be available in a few years) an alternative would then be for NBS or some other agency to be given the responsibility for developing those needed. This would be a sizable undertaking and the cost would be significant. A major corollary task would be to identify the needs and to assess their priority.

The identification of needs, the establishment of suitable criteria, and the development of procedures to select areas of involvement are often mentioned as requirements which can be appropriately fulfilled merely by devoting some

effort to them. But this is not the case. There are many factors which need to be considered which are complicated because of incomparability--such as safety vs. dollars, number of people affected by inconvenience "levels" vs. number of people injured at various "levels," inconvenience vs. dollar savings, etc. A common procedure for resolving such problems is, of course, to form advisory councils composed of reputable individuals. At any rate, some mechanism for choice of activities will have to be developed. This need, though perhaps on a less formal basis, is applicable to other roles involving social need standards.

Since producers have the kind of expertise that is essential to the development of an acceptable, useful standard, it would be necessary to get them involved. But what incentive would a producer have for participating in the development of the standard and for using it once it was produced? Perhaps the same lack of incentive is the cause for failure of the private system to produce social need standards. It is not obvious that NBS would be more successful in this effort on a voluntary basis. The recent change in the Voluntary Product Standards rules should be able to provide information on this question.

e. Review authority resulting from legislation. In this role, the Bureau would actively seek legislation to grant it review authority. Item "c" above discussed the role of voluntary review; this role would differ in the sense that all social need standards would be submitted to NBS mandatorily instead of voluntarily. This sort of authority is conceivable for safety standards and for standards to be codified. Mandatory review for other social need standards would appear to require a different system for their development than what now exists. Bills have been introduced in Congress that would grant this authority to NBS for all types of national standards, but they are not close to becoming legislation. The considerations discussed in "c" above also apply here, but it is expected that industry would be less amenable to the stronger role resulting from legislation.

5.5.2 NBS Identification with only Social Need Standards

NBS identification only with social need standards would mean withdrawal of participation in standards-producing groups that do not produce such standards. In fact, with limited resources it would be difficult to develop a meaningful program in support of social need standards without decreasing efforts in present areas of involvement. Social need advocacy would have the effect of disassociating NBS from standards activity that mainly serve industry needs. This would be quite acceptable to those who question

whether NBS should participate and contribute services to the production of standards which are of concern primarily to large industries which might provide such services on their own or at least pay for them. They state the fact that other NBS services to industry, such as calibration and Standard Reference Materials are provided on a fee basis.

However, the Bureau has traditionally been identified with broad interests in voluntary standards and NBS members acting as general interest representatives have been an important cog in the standardization process. It has built a reputation for objectivity, unaligned overview and genuine advocacy of the standards system. To restrict the Bureau's participation to social need standards would cause NBS to jeopardize its position of leadership and influence in the development of an essential part of the economic system.

Limitation of NBS activity to only social need standards would cause a problem in carrying out the Department of Commerce role. Traditionally, the Department has worked with business and industry to foster, serve, and promote the nation's economic development and technological advancement. There is no reason, however, why the Bureau could not emphasize social need standards more than it has done in the past. The Department is not limited to the interests of business and industry; its recognized objective is to serve the public interest, which is the simultaneous interests of business, industry, and the private citizenry.

5.6 Support to the Standardization System.

If the present NBS role in the voluntary standardization system were examined critically, it would be described as one limited almost entirely to technical support. In this role the Bureau has earned a reputation for integrity and objectivity, but its contribution has been substantially limited to that based on technical knowledge. The following discussion considers an expanded role of support that could be undertaken, along with possible alternatives.

5.6.1 Possible Kinds of Support

One of the Bureau's greatest assets is the high degree of technical competence existing in-house in a great variety of disciplines and subdisciplines. It is widely recognized in the technical community that this competence enables significant contributions to be made to the technical committees that produce engineering standards. In spite of this wide range, however, there are fields in which the Bureau has little or no competence and support

cannot be offered. Thus a possible expansion of its support role is to assess the technical needs of standards committees and, if necessary, develop the necessary competence to fill the needs. A further extension along this line might be to consider participation in standards organizations in which NBS is not now active such as the Aerospace Industries Association of America. This sort of expansion, however, would have to compete with more active involvement in social need standards.

A possible type of support is the maintenance of a storehouse of information on standards and standards activity. Such a central file would be useful in many ways. It could be very effective in avoiding needless duplication of effort. The LaQue Panel pointed out the need for such a central source of standards information, which ANSI has been unable to provide. This type of support is now offered by OESS in a limited but expanding way.

Another method of support is to conduct the research needed to provide the technical basis for an essential standard and to perform preparatory work on needed standards. The former type of support, not necessarily on "essential" standards, is supplied now in significant amounts, largely because it represents the fundamental mission of the Bureau. Because it involves the solving of a measurement problem, the development of test methods seems a logical role for NBS. With the increased interest in consumer product standards, and a concurrent increase in product testing for certification or adherence to specifications, there may well be a larger role for NBS in the development of standard test methods to be used by testing laboratories, especially with the increased emphasis on performance standards.

Support is currently supplied to the system in the form of review of standards as requested, usually on an informal basis. This is usually limited to technical review, for determination of sound scientific basis and feasibility. This role is frequently granted to NBS because of its position as an objective third party. The availability of this service might be publicized and may serve in lieu of the review function mentioned earlier.

A possible support role is research on the economic impact of standards. The results of such studies would be valuable not only as support to the system, but also for internal guidance on where limited resources can be applied most effectively. Economic and systems analytic staff support will be essential if an active NBS policy role in the standardization system is to be based on analysis and facts. This Panel has discovered that assessment of the standardization system and of the NBS role in it requires more than knowledge of

procedures on the gathering of opinions. Standards could be studied individually and by classes to determine their impact on the economy. A related important effort could be a study of whether standards are effective means for solving problems in the area of consumer products. The economics of international standards is another prime area for careful study.

Other support functions could be education of the public and industry on the benefits of standards, and training committee members for both government and industry, in the fundamentals of standards writing. The mass media could be utilized more effectively to publicize the advantages of standards and thereby hopefully obtain industry support for the private standards organizations and public demand for standards.

5.6.2 NBS Identification in Supporting Role Only

Although the uninformed may identify NBS with a more authoritative, responsible role in the voluntary standards process, the enlightened recognize that the Bureau's current role is mainly one of technical support. This role is comfortable, it is defended and guarded by many within the Bureau, but it represents a limited and perhaps inadequate response to the critical problems that exist in the current national system. In its present limited role, NBS is accepted by industry and the system, but it is not utilizing its leadership potential to develop the standards constituency in industry and the public that is required for a better standards system. Furthermore, support activities can be relatively invisible and greater Congressional support might be difficult or impossible to obtain. This is even more the case if support is concentrated on the Types 1 and 2 standards as it has been in the past. There is a good possibility that NBS could develop a significant constituency in the supporting role of providing research and test methods development for consumer products and other social need standards. Many consumer products pose difficult problems in standards development because of the lack of acceptable measures that characterize important properties and the lack of suitable test methods when these measures exist. Support in this type of activity is needed, generally lacks support elsewhere, and is technically challenging. Developments in this area generally make more interesting copy than other types of standards research and thus may make external support easier to obtain.

Most of the outside speakers addressing the Panel viewed support to the standardization system as the most appropriate role for NBS. The particular kind of support each speaker suggested depended upon his particular interests, e.g., Morris Kaplan of Consumers Union cited the need for identifying and

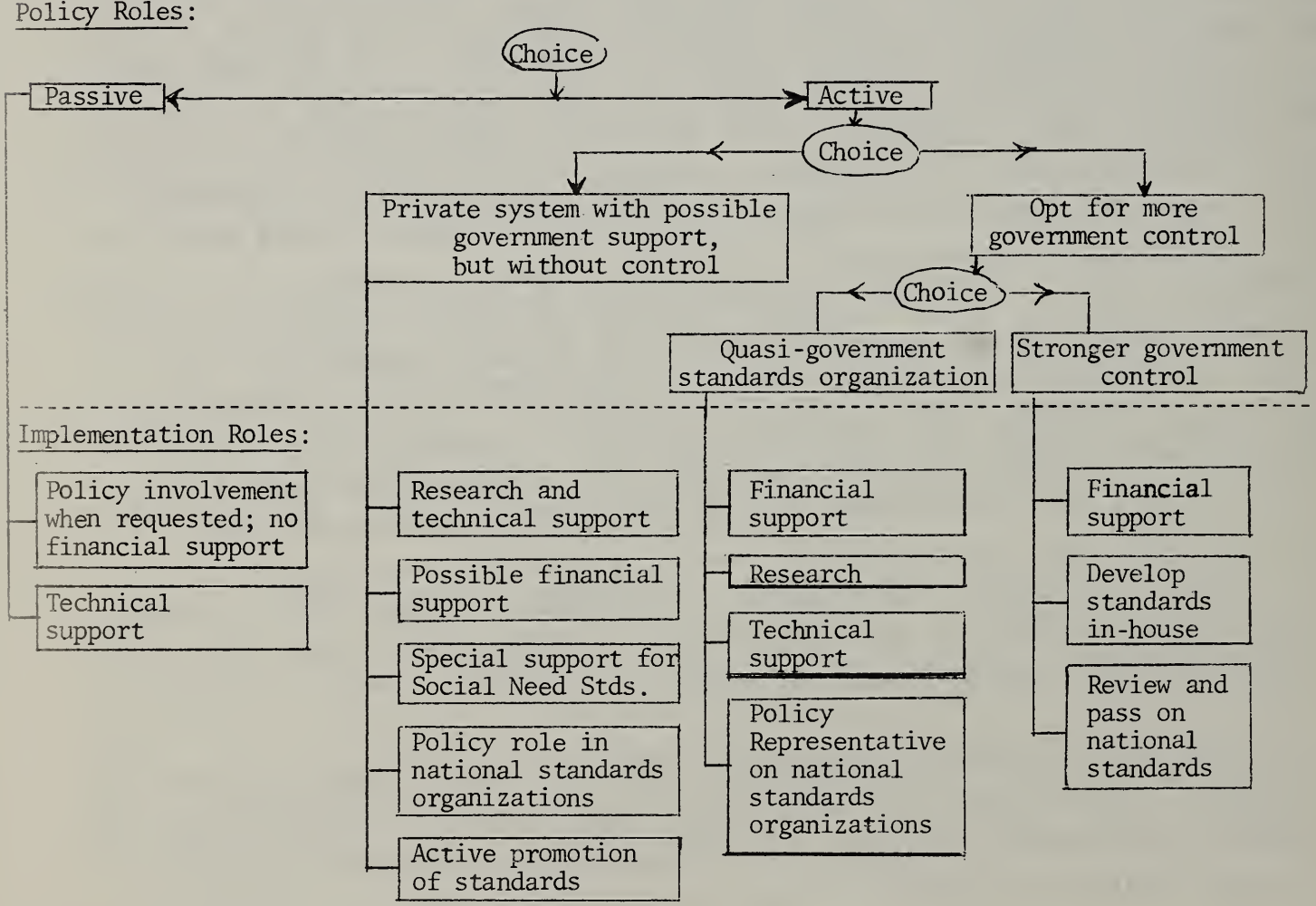
measuring useful properties of consumer goods and John Riordan of DOD suggested research in the theory of standards writing.

5.7 Summary and Recommendations

5.7.1 Summary of Roles

We have identified three specific roles or "identities" that the Bureau might seek in its engineering standardization activities. These three roles are: (1) The Federal Government Agency responsible for the viability and effectiveness of the system that develops engineering standards (Standards System Effectiveness); (2) The agency responsible for the availability and adequacy of standards that serve those not adequately represented in the voluntary standardization process (Social Need Standards Advocate); and (3) The technical resource, the think tank, and research support to the standardization system (Research and Technical Support). The different ways in which these roles might be implemented are summarized in diagrammatical forms.

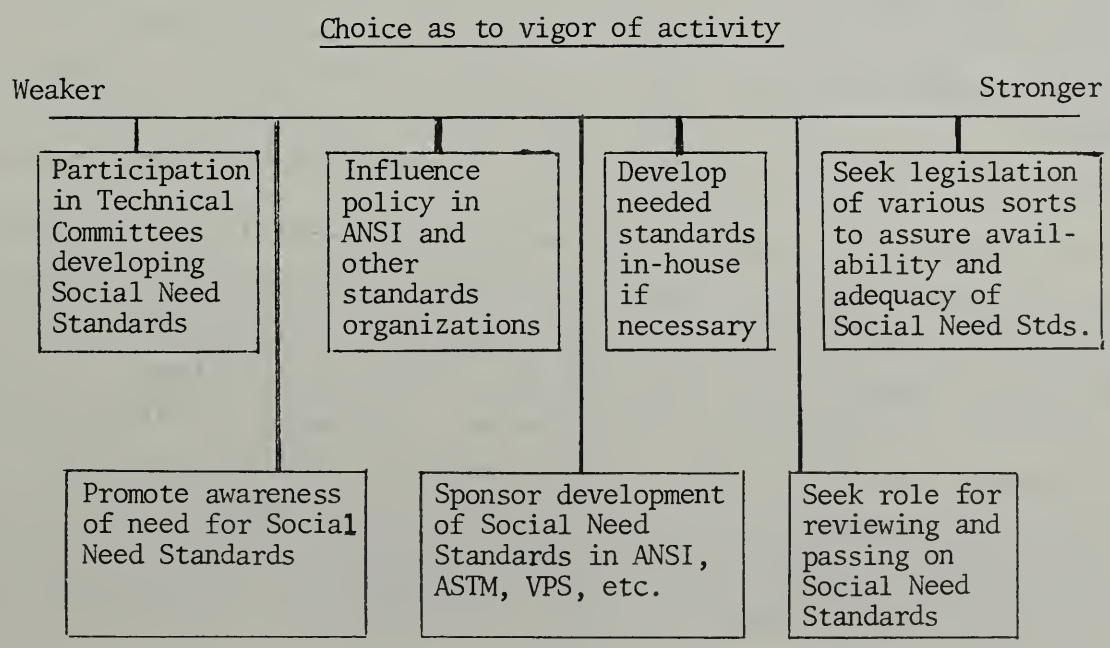
(1) Standards System Effectiveness



This is principally a policy role that will affect the kind of relationship that the Bureau will maintain with the voluntary standardization system. There are two main options -- to take a passive or an active position. The passive position, illustrated by the Bureau's actions during the past 20 years, would support the voluntary system principally through technical committee participation and respond to policy matters mainly at the request of the private organizations. The active position involves a choice of whether to opt for more governmental control of the voluntary system or whether to buttress the private system with possible government financial support, but without government control of standardization activities. The latter position could include active assessment of the system with public disclosure of this assessment.

The "more-government control" route involves a choice of level of control. The mild form is for a quasi-government standards organization perhaps of the BSI or Canadian Standards Council idea. A stronger form could range from control of the sort set forth in the Dingell Bill to the French system and stronger, if deemed necessary. The Bureau's activities under a quasi-governmental standards organization are illustrated in the diagram as having policy representation in the organization, performing research, and providing technical support. The Bureau's activities under the route of active policy participation through the private system would involve active participation in the executive councils of standards organizations, especially ANSI; promotion of standards activities by NBS and DOC officials in industry, etc. The technical committee and research activities would be part of the general support policy.

(2) Social Need Standards Advocate



This is a role that emphasizes the advocacy for standards that are needed by those not adequately represented in the voluntary system. In an active version of this role the Bureau would pursue the development of needed standards that are in the public interest by whatever means available to it, by participating in technical committees and sponsoring committees, to developing such standards. NBS might advocate such stronger actions as seeking legislation to assure their availability and adequacy. Exclusive emphasis on this role would mean that the Bureau would relinquish most of its current technical committee participations, standards information service, much of its international standards participation, etc., and shift to those activities of greater direct public relevance.

The choice is one of emphasis. The very weak version of this role corresponds to certain positions possible under the Research and Technical Support role.

(3) Research and Technical Support

	Choice: Social Need Areas	Choice: General Support
Choice: Emphasize research and provide support to those who develop, test, and use standards. Provide information service, training, etc.		
Emphasize application of knowledge gained by other activities. Emphasize technical committee participations		

This role emphasizes research and technical support to the standardization system. The implementation options of this role are many, although we have compressed them into choices in two dimensions. One dimension is represented by the type of support activity and the other by the target or beneficiary. The activities option has be dichotomized although in reality the two activity categories overlap. The research emphasis may include such varied activities as development of nondestructive test methods; development and experimentation with performance-type standards; economic research on areas of need, benefits of standards, etc.; mathematical, operations research, and

statistical research on risk-benefit analyses of safety standards; training in standards theory and practice to industry as well as government personnel; and development of difficult performance measures for consumer products. The other type of activity is to emphasize application of knowledge gained from other activities. This category would emphasize technical committee participation based on existing knowledge and competence. This category of support generally reflects the current Bureau position.

The other dimension is represented in the table by the two categories of (1) specialization towards Social Need areas and (2) general support, that is, general with respect to subject matter, economic sector, large or small industry, or to functional area, such as safety, terminology. In the table above, a Bureau position would be indicated by a choice of the appropriate cell, or since those categories are really continuous, rather than dichotomies, a location within a cell to indicate degrees of emphasis within and between each dimension.

(4) Combination of Roles

The three roles are not mutually exclusive. In fact, the Bureau can and now does engage in all three roles. Thus, specification of Bureau policy would require choice of the degree to which each of the roles is to be emphasized and the choice of options available within each role.

5.7.2 Recommendations

The Panel reiterates that clarification of issues requires a clarification of objectives. The Panel feels that the Bureau must be much more explicit in its objectives towards engineering standardization than it has been. In this chapter we have described a structure of options that might serve this purpose. The structure does not extend the details very far and many important problems may require much detail. However, policy should proceed from the general to the specific.

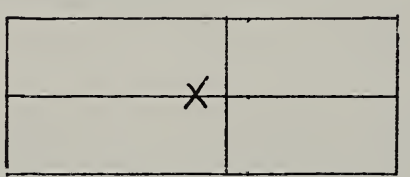
There is no unanimity within the Panel as to its "druthers" -- far from it. There is great variation, in fact, covering the extremes and even a consensus position is difficult to describe. However, the Panel's position might be stated as follows:

The emphasis to be placed on the three major roles would be: Heavy on Effectiveness of Standards System, i.e., the Bureau should take an active policy role in improving the voluntary standardization system including the

development of stronger institutions for the purpose; Heavy on the Support of the Standardization System; and Light (but not zero) on the Advocacy of Social Need Standards.

The active policy role in the system should be with the private system with government technical and possible financial support, but without imposing direct control. The Panel has no specific recommendations on the manner in which this role might be implemented. There are members on the Panel who feel that a quasi-public National Standards Organization will be needed in the future and therefore the Bureau should opt for more government control, directed towards a quasi-public standards organization with which the Bureau would work very closely.

The Heavy on the Support with some Emphasis on Advocacy for Social Need Standards position of the Panel is indicated on the following table:



This indicates that research and other support to the standardization system and technical committee participation should be equally emphasized, more emphasis on Social Need standards than has been the case in the past.

Since the system policy role mainly concerns top DOC and NBS officials, the sense of the recommendation of this Panel is that the Bureau's objective be: active policy role in the private system, principally in ANSI, promoting an effective private voluntary system while its activities would be directed towards the support of the standardization system with greater emphasis on supporting the development of Social Need standards. The Panel is not recommending the kinds of support activities the Bureau might pursue, their priorities, or intensities.

Chapter 6
NBS Management Problems

6.1 Introduction

For this chapter the Panel established the following assumptions:

-- We recognize that the voluntary standardization system may change radically from the system we are currently operating within, but we are limiting our discussion to the subject of improving our participation in the existing system; and

-- Because NBS attitude and management criteria may be different for standards of different types (i.e., nonproduct; industrial product; retail product; obligatory) NBS should be prepared to adopt a flexible management system.

The Panel has tried to keep itself abreast of developments in the "system" during the period of our deliberations. We noted with interest that the NBS Director in his statements to the staff on May 15 made several significant comments on matters concerning NBS standards activity:

- "the Bureau should and must assume the role of being the 'public interest advocate' particularly in dealing with standardization activities"
- "the NBS role of acting in the public interest must be defined as it involves the Voluntary Product Standards program"
- "the Bureau should have a separate 'line item' in the budget for voluntary standardization activities."

We have taken note of the designation of the new Deputy Director of the Institute for Applied Technology "for Engineering and Consumer Standards." We further noted that his operational responsibility includes a role for "monitoring the total NBS involvement in engineering standards and providing information services of a general nature on engineering standards activity on a national basis." In addition he would "serve as the Bureau-wide coordinator for consumer-related matters."

Another significant observation is the interest that the private sector is taking in the product standards area. At the present time the long range planning service of the Stanford Research Institute is completing a report

on "Product Standards in the age of Consumerism" for their clients. Since the Institute for Applied Technology is a client of the SRI, working draft copies of the report have been made available for comment.

6.2 Observations

This chapter will specifically address the following topics:

- Setting priorities and making decisions as to participation on standards making activities
- Systematic and regular review of activities
- Financial management and budget identity
- Attitudes within NBS toward participation in voluntary standardization activities
- Education of NBS personnel engaged in voluntary standardization activities

The first question to ask is - what are we doing in these areas now and does it appear to be satisfactory?

The Panel could find no evidence of any criteria or guidelines that have been issued by Bureau management or used by Bureau personnel to determine priorities involving the type of activity or the type of personnel to be involved. The decisions on involvement have been left mainly to the individual scientist or engineer with varying degrees of encouragement or discouragement from his Division Chief. Pro forma approvals of committee assignments secured through the Institute or Center Offices, have been the general rule. It appears that only recently have these offices become concerned about the participation of their staff in standardization committee activity, and their interest seemed to be stimulated perhaps first by the costs of the involvement and secondly by a genuine concern for the value of the participation in relation to the Bureau's mission.

There has been little systematic review of these activities at the Bureau level. As a matter of fact it would have been well-nigh impossible to do so since the extent of involvement in standards activity was not known. The recent development of computerized information about NBS staff involvement seems to have whetted the appetites of Bureau managers for regular reviews. It would be unfair to leave the impression that no review is carried out at the present time. Many Division Chiefs maintain a strong interest in standards activities, and participate themselves. Many have initiated their own reviews of these activities.

There have only been rough estimates of the Bureau financial involvement in standards activities until recent surveys were taken, supplemented by the survey conducted by this Panel. Until now, only a few Divisions had established accounting projects to capture the costs of their standards activities.

Attitudes of Bureau staff toward standards activities indicate only a "second or third" level of importance. (Chapter 3 points this out.) Standards work is not considered exciting and stimulating by a large number of the NBS staff and about a third of those who participate in these activities feel that there is no apparent reward to this participation.

There is no formal education or training given to the participants or potential participants in standards activities.

In the light of such diffused and varied standards involvements it is a credit to the integrity and competence of the NBS staff that their contributions to the standards system have been significant. It could be said that this is reason enough to justify a benevolent or gentle management of these activities, since it seems to prove that professionally competent people do not need strong management direction.

Whether or not this has been an implicit policy of NBS management in the past, it has left some very significant questions unanswered, such as:

- What has been our investment in these activities in the past?
- What have been some of our significant contributions?
- Why does NBS have over eleven of its staff on a microelectronics standards committee and only one of its staff on the major standards committee concerned with the National Electrical Code?
- What <u>are</u> the economic benefits of the different types of standards?
- When is voluntary standardization the best means to achieve the intended goal?
- What is "Bureau standardization policy" and who establishes it?
- Who determines what areas and what types of standardization activities NBS ought to be involved with?

Our failure to assure ourselves and those "to whom we are beholden" that we have addressed ourselves to these (and other) questions indicates that our present method of managing standardization activities may not be in the best interest of NBS or of the standardization system in which we have a unique and important role.

We believe that at the Bureau level the lack of priorities and guidelines for standardization activities, the absence of systematic review of these activities, little information about our financial involvement in standardization activities, and the need to encourage better participation and recognize significant contributions argue strongly for a change in the Bureau method of managing its standardization activities. We are convinced that our total contribution to the system can be made more valuable and our contribution to the public interest more effective through the establishment of clear policy guidelines and program direction.

In other words, the current method of managing our standardization activities could be improved to:

- be more efficient
- have better direction
- give participants recognition
- be responsive to the most urgent needs of the system.

6.3 Setting of priorities and making decisions as to participation on standards

There is no one in the NBS that (1) has an idea of the precise involvement of Bureau personnel in standards; (2) is assured of the relevance of these activities in terms of NBS mission to national goals; (3) is assured of the general competence of our involvement; or (4) is fully aware of standards committee activity policy. Our effectiveness in fields of standardization is limited because we're not marshalling our resources in any planned manner. Participation in committee activity in many cases is the result of historical legacy or personal preferences.

If NBS management is satisfied that the current level of involvement in directing the Bureau's standardization activities is adequate, or that the priority of this activity is not sufficiently high to warrant a greater investment of funds or management involvement, then little needs to be done

to change the current method of operation--perhaps nothing more than improving the internal information system concerning staff participation in standards activities.

If NBS management determines that the Bureau must make a more effective contribution to the system, for any number of reasons, then it must establish a mechanism for accomplishing this purpose. This can be done by assigning specific responsibilities to existing NBS organizations and personnel or by establishing a specific organizational entity to be responsive to identified problems and newly defined policies. A Program Manager could be designated whose responsibility would be to provide information to all levels of management concerning standards activities, to appraise current activities and assume the responsibility for initiating the development, review, and revision of NBS policy for engineering standards. Management may wish to consider the establishment of an "Engineering Standards Council" whose role would be to establish priorities for NBS involvement in standards activities or to consider the relevance of current or potential standards activities. The appropriate location of these new "entities", whether within one of the existing organizations in NBS or whether given the status of an "independent" office, needs to be considered. All of these considerations would be necessary in order to develop a rationale for an emerging "new" engineering standards role for NBS.

The current process of selecting personnel to serve on committees is often arbitrary and based on convenience. The range of participation by Division or Institute management in selection of personnel runs the gamut from strong involvement to relative unconcern. Perhaps this is appropriate, since Division and Institute managers are responsible for setting their own program priorities, and emphasis on standardization activities in one organization will and must differ significantly from that in others. However, this situation does contribute to the lack of clarity in the total engineering standards activity. Participation in the voluntary standards system should reflect one or more of the following general criteria for the selection of appropriate areas of standardization:

1. Will produce standards that are technically important and contribute to NBS missions and goals
2. Will produce standards that are important in relation to public needs, e.g., safety, health, pollution, economic growth
3. Will lead to a better private standards process

4. Will lead to performance standards rather than design standards
5. Will lead to better informed consumers
6. Will produce standards that have a good chance to be implemented
7. Committee balance is suitable and members are competent
8. Activity presents no conflict of interest between NBS and private standards groups
9. International standards activities will contribute to enhancement of U.S. trade
10. Provide intelligence information on how well the system is working
11. Might permit the NBS man to break a "log jam".

Obviously, each of the above criteria do not apply with equal weight to all four types of standards.

Acceptance of committee participation will require different levels of cost and time commitments by an individual, depending upon the type of assignment. This must be kept in mind by those who select people for committee assignments and by those who approve proposed assignments. It should be understood that approval of a committee membership implies approval of the necessary financial support. If this assurance cannot be made, the appointment should not be made. We feel that participation can be generally categorized as follows, with each category requiring a different set of commitments and, therefore, a different set of approvals.

(a) Sub or task committees of committees that already have approved NBS participation - These are usually very technical and generally have a given project and time scope. Each Division Chief should be authorized to approve participation at this level of participation. An annual survey of these assignments should be made.

(b) Full "Standards" Committees - These are both technical and general. Although technical competence is needed, a knowledge of a broad area of applicability, safety, procedures, and economic and political impact are necessary qualifications for a good participant. The Division Chief should select and recommend approval of such appointment to the Institute or Center. All assignments should be surveyed annually.

(c) Standards Coordination Committees - These are generally the only groups deciding a need for or review of a particular standard. Since these committees make general reviews and have need for technical competency

and strong leadership or world-wide state-of-the-art awareness, these appointments should be recommended by the Division Chief to the Institute or Center for final approval. These assignments should be reviewed periodically.

(d) Policy and Administrative committees of National Standards Bodies (i.e. ANSI, ASTM, etc.) - These responsible positions require a firm knowledge of NBS program policy since the incumbents speak for NBS. Such positions need experienced and able people. The positions require freedom in travel and time. The Division Chief should recommend approval through the Institute or Center to the Director or his designated agent. These assignments should be reviewed periodically.

Other degrees of participation such as secretariats, chairmanships and NBS sponsorships should be approved at a place in the organization that has concern for overall NBS standards activities, after recommendations from the Division Chief and Institute Director. This could certainly be a function of a Program Manager. In general, we feel that Bureau personnel should not seek committee chairmanships or secretariats except in exceptional cases where it has been determined that we want the initiative. These roles are time consuming and relatively unrewarding. ANSI sponsorships should be carefully evaluated before acceptance. In some areas sponsorships may be extremely desirable.

It seems essential that there should continue to be a central record of standardization committee assignments, and that there should be an effort to maintain this record on a reasonably current basis. It is not clear, however, how -- or how much -- the centralized recording should be tied in with decentralized approvals of committee assignments. One possible mechanism would require approval from an engineering standards program manager prior to Division and Institute approvals. Whatever mechanism is adopted, it would be desirable to improve Form NBS-83 (Committee Assignment Record).

Form NBS-83 serves to record all committee assignments, of which nearly half do not involve voluntary standardization activities. There should be a place on the form to identify voluntary standardization committees. Some members of the Bureau staff have suggested that NBS-83 should require information about the expected workload (time, secretarial services) and cost (especially travel) associated with a proposed committee assignment. Other requirements suggested, in the case of standardization committees, include the scope of the committee's work and an explanation of its relation to the Division's technical projects.

A final point concerns the selection of personnel to serve on standards committees. Voluntary standards organizations as a general rule "invite" specific people to be members of their committees. The manner in which these individuals are identified varies greatly. This was verified by a question asked on the Panel's questionnaire. The point is that although the voluntary standards organizations may invite a particular individual for membership, they are, sometimes, seeking first to fill out the committee's membership. For this reason it would not be inappropriate for the Bureau to select an individual other than the one specified by the standards organization. Our concern must be to provide the best available talent - for the benefit of NBS and standards system, not for the benefit of the individual. This is another reason for requiring the appointment of Bureau staff to standards committees to be approved by a central authority.

The following criteria should be applied when selecting individuals to serve on a voluntary standards committee:

1. Technical competence and experience matched to a need
2. Diplomacy needed for high level negotiations, i.e., international standards, standards policy
3. Effectiveness in getting the point across
4. Ability to relate technical competence to areas of judgment, e.g., safety, economics
5. Ability to play an impartial third party role.

The following matrix illustrates how these criteria for selection of individual participants is related to type of assignment:

CRITERION	SUB OR TASK COMMITTEE (a)	STANDARDS COMMITTEE (b)	STANDARDS COORDINATING COMMITTEE (c)	POLICY & ADMINISTRATIVE COMMITTEE (d)
#1	X*	X	X	X
#2			X	XX
#3	X	X	X	X
#4		X	X	X
#5	X	X	X	X

* - Little Experience Needed

6.4 Systematic and regular review of activities

Adequate supervision of diverse activities is difficult, particularly beyond the Division level. However this is no excuse for not having reasonable procedures. Supervision is a most important factor in the success of the standards system within NBS. The lack of involved supervision at the top management levels has greatly diluted the effectiveness of the mass of time, talent, and treasury expended over the years in the activities of NBS in the voluntary standards programs. Although some NBS managers concern themselves about supervision of the standardization activities of their staff, in general, supervision is limited. There should be periodical reviews of all levels of committee participation. These reviews will provide the manager with essential information for decision making.

We should no longer permit such a massive expenditure of staff time to continue without review and evaluation. One of the reasons managers may have been reluctant to question these activities is that they had insufficient information with which to make an evaluation. This system is changing. We now know who our participants are and what committees they serve on. This information must be improved and the responsible office must develop an information system which will provide the tools to make the supervisory task as simple as possible. Given the proper fiscal and administrative information, the supervisor should find it necessary to determine the following information to complete his supervisory responsibility:

1. What have been the accomplishments of the committee in the past year?
2. What was your contribution?
3. How many meetings have you attended and how well was the meeting attended by other participants?
4. What is your honest evaluation of the worth of your continued participation-

    a- for your own personal growth
    b- for the mission of NBS and your own Division and Institute?
    c- for relevance to national goals or problems?
    d- for the relevance to your own discipline?

5. Are you developing an adequate replacement for yourself?
6. When do you see the termination of your committee activity and what would be the result?
7. Are there other areas of standardization activities where you feel you can make a greater contribution or have a greater impact?

8. What is the goal of the committee?
9. What is your role in the committee?
10. What has been the history of standards output from your committee activity?

Discussions between supervisor and the participant on standards committee should not be treated as regularly scheduled annual affairs. It is particularly important at "milestone" situations where a standard is about to be issued or the committee work is reaching a critical stage, that discussions be held. In this manner, a "bad" standard can be identified and the appropriate response of NBS can be planned. This could mean pulling out of the committee, report officially the NBS position to the standards organization, or other means of applying substantial leverage. Because the implications of such actions go beyond the scope of a Division, involvement of NBS personnel at policy levels is necessary. This can be a "Program Manager", an Institute Director, or direct action from the Director's Office. To complete the information circle, if our intention is to improve our participation in standards activity and increase our impact on the system, those personnel at policy levels establishing priorities and evaluating performance must have additional information, i.e., the information outlined in the 10 items above. Certainly, they need to know, additionally, when a standard is to be issued and be advised of log jams or critical problems developing in the activities. Although "reports" are an unwelcomed addition, management must know on a timely basis what is being accomplished and have an opportunity to evaluate it as it is happening. Therefore it is essential that a reporting system be established for all standardization activities so the manager is aware of the activities and the participant is required to show his effectiveness.

Although it has been referred to earlier, it is necessary that the information provided to the manager concerning the participation of his staff in committee activities be improved. The following are suggestions for improvement:

- input of information to the system must be made more accurate and timely
- clear definitions of terms and classifications must be made
- the role of the individual participant must be clarified
- the form NBS-83, Committee Assignment Record, should be completely revised.

NBS participants on standardization committees are expected to perform their services with competence, or else they would not have been selected to serve. We would expect that these participants could handle themselves capably in representing the position of NBS. If he is not able to argue against a standards provision that is technically inappropriate or is not in the public interest he should vote negatively. If he does not know what the NBS position is, it is incumbent upon him to discuss the problem with his supervisor and other personnel who are in a position to provide guidance.

Unless periodic reviews would lead to a higher quality of participation, there would be no reason for a review. The participant's supervisor should carefully review his activities. Knowing of his supervisor's interest and knowing that his activities will be reviewed will certainly make the participant more concerned about his standardization activities. It is also important that accomplishments of significance are quickly brought to the attention of top managers of the NBS so that they are informed, so that appropriate recognition is given to the standards work, and so that significant work can be brought to the attention of concerned and important personages outside of NBS - this includes the Secretary of Commerce, the Congress, and the general public.

However, the evaluation of the impact and relevance of a Division or Institute's total participation in standardization activities should be done at higher level - this can be a role for a program manager monitored by an "Engineering Standards Council". The periodic review procedure would be different depending upon the type of standards being developed (i.e., non-product, industrial product, retail product, or obligatory) and the different types of committees (e.g., technical sub-committee, standards committee, policy committees, review committees).

A very useful document would be a publication of significant voluntary standard accomplishments and on-going "standards-in process" reports. This would bring a level of recognition to the NBS participant and provide a potential tool for interaction between himself and interested and concerned staff. A portion of the NBS Annual Report could be devoted to voluntary standards activities. Hopefully this could also open up channels of communication with participants from other Federal agencies, which could be useful.

6.5 Financial management and budget identity

How can there be any reasonable amount of program review, program direction, or program evaluation in the area of participation in voluntary standardization activities when so little is known about how many dollars we are spending?

Should there be a method of determining standards-related costs? One could argue that "we've gotten along without knowing what these costs have been for a long time - why do we need to know now?" We cannot accept that argument in the face of increasingly extensive pressures on management to operate more effectively with fewer resources. Also, it is simply good business (and, incidentally, in the public interest) to know where and how effectively funds are being expended. In addition, how could you justify additional dollar support for this program when you can't identify what is now being spent?

An obvious thing would be to centralize the financial management of the Bureau's standardization activities. It would be relatively simple to provide funding to a program manager and let him decide what activities to fund. Availability of this funding from a central source might increase "the right kind" of participation and change the attitudes of some Divisions concerning standards activity. But would it be all that easy? At the moment, management doesn't have a solid handle on what these activities are costing. Moreover, these activities are in many cases inextricably intertwined with programs and projects within which they are merely one of several means to an end. Perhaps it would erode the authority of the Institute Director and the Division Chiefs, or they would certainly feel that it would. It would separate these officials from a source of flexibility that up to now has been available to them in the manner in which they allocate their money.

Centralized funding would also make it difficult, in some areas, to permit "trade-offs" between statutory standards authority and other mechanisms. For example, the Computer Center has statutory authority under the "Brooks Bill" to assist in the development of standards in the computer field. Centralized funding would separate the Center from its major source of funding. The Center gets double duty with these funds, providing other related activities with them. From the Center's point of view, central control would be, and should be, totally unacceptable.

Division Chiefs are charged with the responsibility of carrying out specific programs, and participation in standards committees is an essential part of the program in many Divisions. The Division Chief's role should be enhanced and his program responsibilities should not be shared.

We believe that it is premature to consider centralizing the financial management of engineering standards. We do propose, however, that funding for international travel and new funding that might be made available in the future for consumer representation on committees and other special situations, be controlled centrally, probably by a program manager. Perhaps the centralized financial management can be considered as a future goal after it has been first made clear what our financial commitment to the program should be and after standards policies which give clear direction to the programs have been established. Therefore, we believe the financial management system, except that involving foreign travel, should not provide for a central control of funds for standardization activities. Rather it should provide for a system of financial reporting which will permit the various Institutes and Centers to retain the control of the funds they now have, through allocation to their Divisions.

We note that the new NBS program structure clearly identifies "Engineering Standards" as an element in the program to "Promote Strength in the Economy and Equity for the Buyer and Seller in Trade." It is now important that sufficient subelements be provided to identify (a) committee participation, both domestic and international, (b) related research at NBS, and (c) non-professional staff support.

Specific projects should be established in each Institute or Center (preferably at the Division level) to capture certain of the charges for standardization activities. Some Divisions have already established projects of this kind. The Office of Engineering Standards Liaison (or its successor) should monitor the costs of standards-related activities and provide information concerning the total Bureau effort on a more current and more useful basis to all levels of management. Monitoring does not mean "the authority to require accountability from individuals." It means overviewing the activity and alerting management to potential or real problem areas. The supervisor is responsible for the accountability.

The establishment of this system will provide the manager, whether he be responsible for a Section, Division, Center or Institute, or the Bureau, with desirable and useful information and a tool to evaluate the work for

which he is responsible. The system should be sophisticated enough to be able to identify costs of our participation in the various types of standards (i.e. non-product, retail, etc).

As previously stated, the appointment of personnel to standardization activities must carry with it the burden of total financial support. This may include the cost of education of the personnel, research or testing to support these activities, time spent in the preparation for meetings, secretarial help, travel, registration fees for meetings, and membership dues required by private standardizing bodies (for instance, members of the NBS staff that do not hold personal membership in ASTM may soon be charged an administration fee of $25 per person).

An annual allocation of funds should also be made to a central authority for such activity as: support for domestic costs related to particular international activities; support for public interest representatives (not NBS staff) on standards committees; and support for the added costs of NBS committee sponsorship or secretariats when that load is too much to expect a Division to handle.

In principle NBS should not permit a party of interest to pay travel expenses or any other type of reimbursement for expenses of NBS staff members related to standardization activities. We must never permit the possibility of a "conflict of interest" to permeate our standards activities and destroy our reputation as an independent third party participant. It should be made clear that even if the NBS participant is "not representing NBS" the cloak of NBS responsibility cannot be shed. Therefore, it should be Bureau policy that expenses should be provided either by NBS, by the private standards bodies, or by quasi-federal organizations such as the National Academy of Science, or Engineering, OECD, and the like. On the other hand, the NBS should continue to welcome industrial research associates as collaborators in standardization works. It would also be appropriate for the Bureau to accept grants from industry to be used as we see fit for standards activities so long as appropriate legal restrictions are observed and individual staff participation is not directly dependent on such a subvention.

At times an NBS staff member is appointed or elected to a position in a professional society, and in that capacity has occasion to be involved in standardization activities. Such participation, even if undertaken on behalf of the society, does not free the staff member from the necessity

of receiving approval for such participation and adhering to the principles of NBS policy. Under these circumstances NBS should encourage staff members to accept professional society responsibilities to strengthen the standards system.

There is a major issue to be resolved concerning the identity of standardization activities in our congressional budget. Since the new program structure identifies engineering standards activities, we assume that a line item in the budget will appear for these activities. We feel instinctively that it is a good idea. It represents a large expenditure of public funds and should have the opportunity for exposure to public debate. It should permit us the opportunity to clearly state the reasons for these activities, the current problems of the system, and the ways in which we can contribute to a more effective system. Since the subject is controversial and the role of NBS in the system not clearly understood by those outside of the "system", we might expect to be chastised and made guilty by association from the vocal critics of the system who have the ear of the Congress.

If the Bureau is convinced it should plot a new or broader course in standardization activities, then it must secure congressional support financially and otherwise. Therefore, it must explain its plans to the Congress in its budget presentations.

6.6 Attitudes within NBS toward participation in voluntary standardization activities

Have the attitudes of supervisors and of management had an adverse effect on NBS participation in voluntary standardization activities? -- preventing or discouraging work by people who might have been willing and able to make significant contributions? -- assigning committee work to reluctant or ineffective people?

What are the attitudes of the NBS staff toward standardization committee work? Should these attitudes be changed, either generally or selectively?

What are the facts?

"All but one division chief felt that standards work was a low prestige endeavor" [summary by F. McManus of interviews with several division chiefs during February 1969].

The 1970 Institute and Center program reviews did not report on standardization committee activities except CCST and Division 425.

Most NBS committee participants do not perceive rewards from NBS: Among 877 multiple choice responses in the survey conducted by this panel, the rewards were seen preponderantly in the categories:

- increased prestige in professional community 303
- no apparent reward 317
- personal satisfaction 121

The motive "carrying out a role that management feels is important" was reported for only 126 committeeships. (See Chapter 3 for details.)

Similar findings were reported by Quarforth (a former Commerce Science and Technology fellow) in his Progress Report No. 3, March 1966 (pages 15-16):

> "In general the incentives that motivate the NBS staff to participate in engineering standards committee activities appear to be primarily personal interest and dedication to the need for engineering standards considering their benefits....
>
> "Standards work is arduous and does not require the full competence of NBS staff. It is therefore not as desirable an activity as participation in creative and original Division project work....
>
> "Standards societies do not appropriately recognize good or superior work by participants. For example, standards issued by ASTM, even where generated by months, perhaps years, of tedious effort on the part of NBS staff, do not recognize such effort either by acknowledgement in the standards issued or by other appropriate means."

The Rosa award was established to recognize work in engineering standards, but intermediate types of awards (Gold and Silver medals, other incentive awards) are probably not often given for such work.

What actions might be taken?

Generally, to reward standards committee work

(i) Incentive awards and promotions

(ii) NBS policy statements and directives

(iii) Publicize committee work within NBS and in TNB, Technical Highlights, etc.

Selectively, to encourage more discriminating attitudes

(i) Focus attention, in program reviews, on the interaction between standards activities and other technical activities.

(ii) Disengage from and discourage acceptance of committee assignments that are seen only as "onerous public service duties."

(iii) Give special recognition to standardization activities that exemplify the Bureau's leadership role in implementing new technologies.

(iv) Give more careful attention to the selection of personnel assigned to standards activities.

Advantages and disadvantages

Open announcement of broad-spectrum endorsements, directives, and policy statements would be appealingly dramatic but can have unpredictable consequences since such statements must of necessity be applied to widely different kinds of people and circumstances. Those who are at present convinced that standardization is "work for plodders" will not change their minds on the basis of a general endorsement. Until the community at large rewards standardization work, some of the Bureau's best young staff members (those anxious to improve their reputations in their scientific fields) will shy away from it. Such people might, however, be open to conviction that some particular standards project is the best way to accomplish the objectives of a technical program.

Implementation

General actions should be implemented informally through line management. Division chiefs should accept the obligation to give appropriate recognition to the work done in committee assignments that they approve. Approval of committee assignments could be made to be or appear less automatic.

6.7 Education of NBS personnel engaged in voluntary standardization activities

Participation of the well qualified technical people at NBS on committees is a desirable goal; however it creates three problems: First, there is tendency, not confined to NBS, to regard standardization work as dull, second-rate and not deserving the attention of good scientists and engineers. Second, when an NBS representative performs on a committee, the philosophy guiding his efforts is generally left up to him. Third, the best qualified men may be neophytes in the standards game. How does one "get on board"?

There is nothing that has indicated to the Panel that our effectiveness on standards committees has been limited because of the competence or lack of it by the Bureau's participants. For this reason we find no justification for arguing for greater participation by highly competent Bureau personnel, some of whom have heretofore shunned this type of activity. It is interesting to note that none of the top managers of NBS (including Institute Directors) are currently active or ever were active participants in standards committee activity.

What seems to be needed is a greater Bureau-wide awareness of the benefits of standards activities and a recognition of their importance. Although it is a fact that these activities will never achieve the status of being glamorous and "scientifically rewarding", there is conversely no reason to assume that good competent scientists and engineers will not be attracted to this activity and find it rewarding.

Bureau personnel need to know more about the role of engineering standards in our economy and the effect they have, to be able to better understand the system so that the attractiveness of the work can be emphasized. A more thorough review of current and potential committee activities by program personnel and an Engineering Standards Council, should be able to identify and encourage vital and interesting activities and discard marginal and nonrelevant assignments.

There is precious little "bureau policy" for committee activity guidance. NBS representatives on committees function satisfactorily without definite policy guidance; at least it is assumed so. However, once such a policy is formulated (which will enhance the activity) every effort should be made to insure that NBS representatives are thoroughly familiar with it. When policies are chosen they should be incorporated into a publication that will be kept current and active.

New participants on committees are often thrown into standards activities which confuse and frustrate them. They are not familiar with the workings of standards committees or the standards system. These problems might be overcome by assigning new members as "alternates" or training the new participants in committee activities. The alternate "role" permits the participant to work into the activity slowly before the incumbent member leaves. Instructional classes can be extremely useful, if conducted by individuals well versed in the standards procedures and organizations.

In summary, the following tools would be useful for training participants in the "system":

- publication of an Engineering Standards Policy and Procedures Manual
- a collection of literature about the standardization process (much of this has been gathered by this Panel and can be very useful)
- periodic short courses or workshops in standardization activities could be conducted by the Office of Engineering Standards Services. In addition to NBS personnel, industry representatives could be included.
- appointment in each Division that participates in standards activities of a "technical representative" to serve as a Division advisor.
- participate actively with ANSI, ASTM and others to actively support and advance the "system".

6.8 Nature of NBS participation

The role that NBS and NBS personnel play is certainly not the same in every case and depends to a large extent upon the class of organization involved. (See Chapter 2 for a description of Scientific Bodies, Professional Societies, Listing Bodies, and Voluntary Standards Writing and Promulgating Bodies.) The role also depends upon the purposes of voluntary standards, and their priorities, that NBS deems worth supporting. Briefly these purposes (not in order of priority) include (1) the exchange of technical information, (2) the uniform determination of physical quantities, (3) the conservation of scarce national resources, (4) the improvement of communication between buyer and seller, (5) the establishment of recognized levels of quality, (6) the enhancement of interchangeability and ease of replacement, (7) the provision of acceptable levels of safety, and (8) the establishment of equity in the marketplace.

The activities involving the exchange of technical information, and the uniform determination of physical quantities (which include the setting of definitions, terminology and symbology) should be actively maintained by NBS. Within the bounds of the Bureau's Mission, activities should also be directed toward the conservation of scarce national resources by helping to avoid duplication and waste.

It is the Panel's opinion that in work on voluntary engineering standards, including those for retail market products, NBS should not put on the mantle of consumer advocate but should continue to serve as a "general interest group", insuring technical correctness and integrity of standards and in addition seeing to it that precautions against environmental harm get into standards. There is a definite role for bringing conflicting interests together. NBS can, therefore, be of valuable assistance to the nation's commerce through its activities in voluntary standardization by contributing unbiased (third-party role) technical information, leadership and procedural and policy guidance.

Bureau people could conceivably serve on any committee that deals with a subject within the area of our Mission and in which they are technically competent. Participation, however, should be limited to areas selected by a system of priorities. These priorities might be developed by an Engineering Standards Council mentioned earlier in this Chapter and recommended below. In addition, if the priorities that will be agreed to indicate that NBS should be represented on a particular committee when it isn't, then a position on that committee should be actively sought. It should also be understood that these priorities may eliminate some current committee participation. The NBS participant should, in most cases, be an activist with regard to influencing a committee's work in a technical way. Assuming that priorities and criteria have been used in approving the area and participant for a committee activity the Bureau should back its decision with necessary funding.

An active role also logically extends to policy positions on standards organizations. Policy positions, where they do not involve a conflict of interest, should be actively sought and used to influence the direction of these organizations. The voluntary standards writing and promulgating bodies need to be pushed into the consumer and safety areas.

It is also the opinion of this Panel that NBS participants should fully exercise their right to vote on all committee questions, assuming of course that there is no conflict of interest involved. There is really little difference between the ability of a voting member and a non-voting "advisor" to lead a committee out of darkness on technical matters but an active voting member can also exercise what is practically a veto power by voting "No" when he thinks it necessary.

Since it is practically impossible to divorce the actions and opinions of individual NBS personnel from the public's conception of what NBS is and does, it has been a long standing policy to have all written material that is to be published pass through the NBS editorial process. With this same principle in mind, it is considered essential that all NBS representatives to standardization activities be considered official NBS representatives and that they correctly reflect Division, Institute, and Bureau positions when applicable. The few possible exceptions to this rule, where individuals would represent themselves or other standardizing organizations, should be clearly stated that NBS is not represented. Even so, an individual representing himself in this fashion should not take positions contrary to stated NBS policy.

The tenure of an individual on a committee should not be limited and thus lose the great advantage of experience and continuity. Membership, however, as well as relevance and results, should be subject to periodic review. The situation of having two or more individuals on the same committee should be avoided as much as possible and some measures should be taken to assure the training and inclusion of young people in standardization activities.

We would like to make a specific observation concerning the participation by NBS personnel in our "Service" Divisions on standards committees. There is a great variation in the degree and emphasis placed on these activities. In general, personnel in our Service Divisions (Plant, Administrative Services, Shops Division, Measurement Engineering, Personnel, etc.) either participate only slightly or don't even consider the possibility. When the possibility was suggested to one of the Division Chiefs he was pleased at the potential, was glad to be asked, and considered the prospects in terms of broadening the impact of his Division and personnel. One Division Chief stated that he did not consider committee participation at all since his was a "service" organization. He would have to increase the service "fee" if his staff were to take on some committee activity. He felt that this would not be acceptable to his sponsors. One Division Chief in this category actively participated in committees and considered it important. We suggest that there is talent within NBS, other than in the scientific and engineering positions, that should be encouraged to explore the potential of committee activity. The area of safety standards would seem to be particularly appropriate. It would also seem that committee participation would encourage a dialogue between professional and non-professional personnel which can have beneficial effects.

6.9 What kind of management do we want?

At the present time there is little identifiable structure to the engineering standards activities within NBS. There are small organizational units that serve various aspects of private voluntary standardization activities, but there is nothing that clearly stands out as the nerve center of this large activity. In recent years NBS has played a significant role in the national voluntary standardizing activities that can aptly be described as that of a "reluctant dragon." The "direction" of these activities in NBS has been decentralized with a great amount of knowledge and interest in the standards activities possessed by a few members of the staff who received a kind of "benediction from on high" that service of this type was commendable and that "everybody accepts the fact that standards are good."

However, Bureau management has recently made two decisions that will have a significant impact on the "management" of engineering standards activities within NBS:

1. The establishment of a Deputy Director of the Institute for Applied Technology for Engineering and Consumer Standards with responsibility for monitoring the total NBS involvement in engineering standards; and
2. The transfer of personnel from the Office of Engineering Standards Liaison from the Director's Office to the Institute for Applied Technology. (We assume that management expects this Issue Study to address the question of what kind of organization ought to be established in NBS or be concerned with voluntary standards activities and where it ought to be.)

Specific Recommendations

1. There should be an office within NBS whose concern is the Bureau's total involvement in engineering standards activities. If for no other reason, the gathering of information about individual staff participation in standards activity would justify the assignment of staff for this office. Other functions can be very useful to managers to better administer their engineering standards activities such as maintaining useful information

about the voluntary standardization system both domestically and internationally or to identify inconsistencies in the Bureau's standardization activities that are obvious only when the total aggregate activities can be reviewed. The only reason for not having an office of this type would be if NBS management would decide to withdraw from or de-emphasize engineering standards activity.

2. The Director should appoint an Engineering Standards Council, to be concerned about establishing priorities for the Bureau's involvement in voluntary standards activities. This Council would be a forum where the Bureau's policies for standards activities are generated. We realize that several years ago a standards council was formed and that it was an unqualified "ho-hum" affair. The environment is significantly different now due to increased interest internally and externally in standards activities.

   As a first step, the Council should undertake a study of the relevance to the NBS mission of current standardization committee participation by NBS personnel and their relevance to the current national needs and priorities. The Council should have available to them, staff services to delve into specific problems with sufficient depth to provide the basis upon which policy may be established. The Council must be concerned about current standards activities that are of quite marginal value and about those standards activities which are significant where there is no NBS participation. For example, the Aerospace Industries Association is the third largest producer of domestic voluntary standards and only one NBS staff member serves on any of their standards committee. Apparently, in the past, no one at NBS has been concerned about finding out why. With data provided by staff services that have identified inconsistencies, the Council can

seriously deliberate these questions and establish future goals.

3. The Director should appoint a Program Manager to be the Bureau's representative to the standards community. It is essential that in NBS, one person be identified as the "standards man" to the private standards bodies and those outside of NBS concerned with voluntary standards activities. The Program Manager should also provide for internal management of engineering standards activities.

   The question of where the Program Manager should be located is a point to be discussed. To a great extent, it depends upon the direction the management of NBS decides for its standards activities. If, for example, it is determined that the Bureau will expand or redirect a greater position of its standards activities into the area of "social need" standards then the location may be different than if the determination were made to contain our efforts more toward nonproduct or industrial product type standards. If it is determined that operating programs should not be managed at the highest level of management at NBS (i.e., the Director's Office) then that decision will have an impact on the position location.

   It is the opinion of this writer, (and this opinion <u>is not</u> a unanimous opinion of the Panel) that the position should be located in the Institute for Applied Technology for the following reasons:

   a. There are many indications that NBS should become more involved with social need standards, and these types of standards are more applicable to IAT than any other of NBS's major units;

b. IAT has the Bureau's major involvement in engineering standards activities at the present time;
c. There is a major interest by IAT staff in engineering standards to a degree not shared in other major units;
d. An adequate "check and balance" will be provided by the Standards Council.

4. Chapter 3 outlines the responsibilities of the Department's Office of Product Standards. The functions of the office as stated in Departmental Order 16 are both significant and vague. With the small staff now assigned to the office it is difficult to see how the high sounding functions can be performed effectively. Furthermore, the name of the office is misleading. The real role of the office is one of high level policy determinations, and therefore "policy" should be reflected in the title. The Office of Product Standards is a dull name that says nothing, and reminds the standards community of the Department's old moribund "Office of Commodity Standards".

The office should function principally as a catalyst within the system:
a. This office should take the initiative to convene a series of conferences of the leaders of the private standards bodies to collectively discuss standardization problems and how best to improve the system.
b. This office is in a unique position to use the "clout" of the Assistant Secretary to involve other agencies of the Department in standards activity particularly in economic studies that can be useful in plotting a course for future directions.
c. Coordination of international standards activities is a most significant function for the office since it directly involves the mission

of the Department in its total concern for international trade.

d. Its continuing role in providing coordination of standards activities throughout the Federal establishment should, of course, continue even though it is without definitive policies at the monent.

e. The role of assuring that economic, social and legal implications concerning standards matters have been taken into consideration is essential, particularly now that the Department and NBS are becoming more involved with standards problems that have these ramifications.

Appropriate staff assistance should be provided for this office by NBS to assure that these beneficial functions are carried out and so that NBS has an opportunity to make significant contributions to policy positions.

Considering the previous recommendations, we have outlined the responsibilities of the "hierarchy" of organizations involved with engineering standards activities in NBS.

Institute or Center Director: provides Institute coordination of standardization activities and reprograms or reallocates funding within the Institute or Center to respond adequately to Bureau policy, provides and receives guidance and advice from his Institute's representatives on the Standards Council.

Division Chief: provides technical supervision over the standardization activities of his staff; allocates, as appropriate, his funds for participation of his personnel in standardization activities; reviews critically his staff's participation in standards work using guidelines and policy provided by the Standards Council and guidance received from a Program Manager; makes the final decisions as to whether or not his staff

participates in committees although recommendation may come from higher authority.

Engineering Standards Council: reports to the Director and as required advises the NBS Executive Board; chairman and members should be selected by the Director, NBS; provides the forum in which NBS standardization policy may be developed, including self-generated issues; conducts studies on its own initiative, or through staff services arranged by the Program Manager; annually reviews the Bureau's standardization activities of NBS for the Director and submits its findings in a report; reviews and recommends action by the Director, for requests for participation in private standards bodies policy positions and in requests for NBS sponsorship or chairmanship of standards committees; provides policy guidance to Institutes and Centers concerning standardization activities currently underway versus other areas more appropriate or relevant.

Deputy Director, IAT, for Engineering and Consumer Standards: will have direct operational responsibility for the office of Engineering Standards Service and for standardization activities of other IAT divisions; responsible for the Bureau wide monitoring of engineering standards activities.

Program Manager, Engineering Standards Activities: provides information to all levels of management concerning NBS participation in standardization activities; arranges for sufficient staff support and resources to the Standards Council for studies or programs recommended by them; implements Departmental and Bureau policy concerning standardization activity; initiates appraisals of NBS engineering standardization activities and assumes responsibility for initiating the development, review, and revision, of NBS policy for engineering standards, including legislation; manages special funds that should be provided to support new initiatives in standardization such as support for consumer representatives on voluntary standards committee, support for committee sponsorships or

secretariats that are determined to be of general NBS concern; is an ex-officio member of the Standards Council; is the Bureau's representative to the Standards Community.

Office of Engineering Standards Services: provides assistance to business and industry groups, to agencies of Federal, State and local governments and to consumers in the development of standards, and in developing standards as required by statute or determined to be in the best interest of the public.

Office of Standards Information: provides a secretariat for the Standards Council; maintains inventory of NBS engineering standards activities; provides Bureau-wide control of funds for international travel related to standardization activities; provides information with respect to engineering standards.

Office of Standards Policy, DOC, (Now Office of Product Standards): interacts with private standards bodies concerning the direction of standardization in the U.S.; provides secretariat and chairmanship to the Interagency Committee on Standards Policy; coordinates standards activities within the Department and encourages interagency cooperation; identifies and analyzes interrelated technical, economic, social, and legal factors bearing on standards policies.

5. Other Recommendations

Throughout Chapter 6, suggestions have been made and recommendations proposed. These are summarized below:

A. There should be a central registry of and a central approval mechanism for some specific types of the Bureau's engineering standards activities.
B. The current form NBS-83 "Committee Assignment Record" should be completely revised.
C. A reporting system for engineering standardization activities should be developed.

D. NBS should publish a regular document of significant engineering standards accomplishments and a log of standards in process.

E. Develop a system for capturing costs involved in engineering standards activities.

F. Establish a policy that would permit NBS to reimburse their staff for required personal memberships in standards organizations when the work is official business of NBS.

G. Carefully protect the "third-party" role on engineering standards committees that NBS participants have maintained, in the public interest.

H. Take steps to more adequately reward standards work of note.

I. Develop explicit policy statements for the guidance of NBS staff who participate in engineering standards activities.

J. Expand the collection of data about the "standards system."

K. Develop a training for participants in the "system."

L. Encourage the involvement of "nonprofessional" personnel in engineering standards activities.

Chapter 7
NBS and International Standardization

7.1 Introduction

U.S. participation in international standardization is just as complex as it is domestically. The principal thrust of U.S. participation in voluntary international standardization is with the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC). The United States has a limited interest and involvement with Pan-American Standards Commission (COPANT), a regional standardization organization. ANSI is the U.S. member of ISO and COPANT and through the U.S. National Committee (USNC) for the IEC, an ANSI affiliate, is the U.S. member of the IEC.

7.1.1 International Organization for Standardization (ISO)

ISO promotes the development of international standards (called recommendations) to facilitate the international exchange of goods and services and to develop mutual cooperation in the spheres of intellectual, scientific, technological and economic activity. Member bodies of ISO are those single national organizations from each country (there are presently 54 members and 11 correspondent members) which represent that country and agree to abide by the ISO Constitution and Rules of Procedures. Correspondent member nations are usually developing nations without a comprehensive standards program or standards organization.

The ISO Council consists of the President elected by the members and the representatives of 14 Member Bodies. The Secretary-General and his staff administer the activities of ISO. Technical Committees (TC) are authorized by the Council to consider specific technical questions. Each Member Body can be represented on any committee as either a (P) participating member or as an (O) observing member with no vote. One of the (P) members of the Technical Committee is designated by the Council to act as the secretariat of that committee. As the TC secretariat, this Member Body is supposed to maintain a strict neutrality in its official activities.

Any Member Body or organization maintaining a liaison relationship may propose the development of an ISO standard. If the proposal is a new question it is

sent to the Central Secretariat which then submits it to all of the Member Bodies for comment. On receipt of these comments and further review by the originator, the proposal is submitted to the Council. If the Council agrees with the proposal, the Secretariat of a new Technical Committee is allocated to a Member Body. If the proposal is not a new question it is sent directly to the Secretariat of the cognizant Technical Committee. If the Technical Committee agrees, the proposal will be considered further.

During study of a proposed standard by a Technical Committee, account is taken of the data assembled by the originator and of information collected from other sources. Alternatively, a standard used in one or more countries may be submitted for consideration. When this study has reached a suitable stage the committee secretariat will prepare a Draft Proposal embodying the agreement established. If this Draft is approved by 51% of the (P) Members of the Technical Committee and 60% of all Member Bodies voting, it is submitted to the Council for consideration as an ISO Recommendation. If not approved, the Technical Committee may prepare a new Draft Proposal.

ANSI serves as the USA Member Body of ISO by virtue of its own initiative although no other U.S. organization other than ASTM could qualify as "the national body most representative of standardization" in the United States. In this capacity the Standards Institute acts for U.S. interests and coordinates all American participation in ISO activities. Actual USA participation in the ISO technical work is conducted by USA National Committees composed of experts representing U.S. interests for each committee on which the United States wishes to participate. If an ANSI Committee dealing with a specific subject is in existence, it represents a ready-made means of establishing a consensus and is assigned the ISO responsibility. If no ANSI committee exists, assignment of the responsibility may be made to a committee of a national organization, such as ASTM, competent in that field. If neither of these possibilities exists, a specially created committee, representative of all groups concerned, may be formed for the purpose. These groups are responsible for providing delegates to the international meetings and for advising ANSI of the USA position on all technical committees. A U.S. National Committee exists for virtually each ISO committee although some do not actively meet.

7.1.2 International Electrotechnical Commission (IEC)

The object of IEC is to facilitate the coordination and unification of national electrotechnical standards. The work of IEC covers all spheres of electrotechnology including the field of power. The members, National Committees formed especially for participation in IEC, are required to be as representative as possible of all electrical interests in the country concerned: manufacturers, users, governmental authorities, teaching, and professional bodies.

The work of IEC is carried out by a Council, a Committee of Action, Technical Committees, and a Central Office. The Council, responsible for the proper expenditure of funds, is made up of the IEC President and the Presidents of the National Committees. The Committee of Action, consisting of the IEC President and nine Presidents of National Committees elected by the Council, deals with problems delegated by the Council and takes any necessary action to insure satisfactory operation of the technical work. Technical Committees deal with specific areas in the electrotechnical field. The Secretariats of the Technical Committees are appointed by the Council, usually at the request of a National Committee. As in ISO, the Secretariats act in an international capacity, divesting themselves of their national point of view.

The U.S. National Committee (USNC) is the U.S. member of the IEC. It was founded in 1907 and since 1911 it has been affiliated with ANSI and its predecessors. The routine work of USNC is delegated to an Executive Committee and its technical work is managed by a technical advisor and an advisory group for each IEC Technical Committee in which the United States has agreed to participate. To some extent these coordinated advisory groups are centered on existing ANSI electrical and electronics standards committees but they also include representatives from acoustical and mechanical engineering groups and distinguished members-at-large.

7.1.3 Other Organizations

U.S. participation in other international organizations which have some interest in standardization is usually channeled through its U.S. affiliate, often called the U.S. National Committee. Thus, the U.S. National Committee for the International Commission on Illumination is the U.S. member.

International Scientific organizations such as the International Union of Pure and Applied Chemistry are also represented by U.S. affiliates; often the U.S. secretariat is held by the staff of the National Academy of Science--National Research Council--National Academy of Engineering.

Although the major impact of formal U.S. participation in voluntary international standardization is through ANSI, the NATO countries also engage in standardization within that organization. The United States, Canada, and Great Britain, the so-called ABC countries, are also engaged in a more specialized type of standardization because of our more long-standing historical relationship and because of our use until now of the English system of weights and measures.

Certain governmental and quasi-governmental groups also develop standards and there is evidence that such activity is mounting despite the increased effort of ISO and IEC to respond to the greater interest and need for international standards. These groups include: 1) the Economic Commission for Europe (ECE) and the Food and Agriculture Organization (FAO), both United Nations agencies, 2) the Organization for Economic Cooperation and Development (OECD), a group of countries concerned with sustaining economic growth, 3) the European Economic Community (EEC), the Common Market countries, and 4) the European Free Trade Association (EFTA), the eight countries comprising the "other" common market. Voluntary standards developed by these organizations frequently become mandatory when adopted into law by member countries.

7.1.4 International Organization for Legal Metrology

Since this paper deals only with voluntary organizations which develop standards, activities of certain international organizations which develop voluntary standards that are voluntarily or normally enacted into law are not discussed. A general comment on the International Organization for Legal Metrology (OIML), however, is in order. OIML is a treaty organization concerned with the principles of legal metrology and specifically the legislative problems in unifying methods and regulations in metrology. OIML has 36 member nations and seven corresponding members, most of which are European.

The United States did not join OIML in 1955 because we preferred this activity to be undertaken within the United Nations. Recently the Department of Commerce, ANSI and substantial segments of affected U.S. industry are publicly on record as being in favor of U.S. government membership on the grounds that U.S. export trade is adversely affected and will be more so in the future by our non-membership. This issue has been under study by the Department of State for some time and has not yet been resolved because of various political complexities.

7.2 Issues*

A comprehensive study of the issues pertaining to U.S. participation in international voluntary standards, and the responsibility of the U.S. government for assuring an adequate, if not an excellent, involvement would comprise a sizable issue study itself. This chapter is limited to what NBS is doing in the principal voluntary international standards organizations, the International Organization for Standardization and the International Electrotechnical Commission, and a consideration of what it should be doing. Nevertheless, there is one issue that should be raised because it is crucial to NBS participation in international standardization: Is it possible for any private organization dominated by business interests to represent the best interests of the United States in international standards? The question implies that this endeavor actually or potentially affects the interests of the United States at large over the short and long run and that business interests cannot represent the public interest. While a specific position cannot be taken by this Panel to concur or disagree, there is some risk that industry may take actions unilaterally which conflict with the broader U.S. interests in our balance of trade. One example may suggest a general

*In this chapter, the discussion will be limited almost exclusively to activities involving products (i.e., Type 2 and 3 standards concerned with industrial or retail market products). The important area of Type 1 standards (nomenclature, definitions, general test methods, etc., of interest to scientists and engineers) is not considered since the issues and contentions of the Type 2 and 3 categories are absent from Type 1. However, there is a very considerable international activity in this field, in which NBS must necessarily participate. Such standards operations generally proceed without serious controversy and at a pace appropriate to scholarly consideration.

attitude, especially of those American firms which have widespread manufacturing facilities abroad. U.S. can manufacturers do not participate on ISO/TC 52, Hermetically Sealed Metal Food Containers, because 1) they export few cans, and 2) U.S. subsidiaries or licensees of these companies in foreign countries have a large percentage of those markets. The attitude of the can manufacturers is that they will produce what their consumers require, regardless of any standard. They do not therefore find it useful to participate in standards development.

After several years in which the United States was not represented on TC 52, the National Canners Association learned of the imminent development of can size standards not in conformity with U.S. sizes. The fear that certain markets would be lost to their members prompted the Association to become active in this committee.

A practical answer to this issue should await the results of a comprehensive study concerned with the actual or potential effects of international standardization on U.S. trade. At that time the specific issue of the failure of certain segments of U.S. industry to participate or even to be aware of certain international standards matters in ISO and IEC activities should be reviewed.

7.2.1

The principal issue facing NBS concerning international standardization is to reconcile our technical input to the fact that the major concern of the United States for international standardization is trade. Thus, economic considerations are the paramount concerns of U.S. delegations. They seek to increase their markets or protect them, and standards are simply one mechanism which can help or hinder U.S. trade. Likewise, the absence of standards can have a beneficial or deleterious impact on U.S. exports to particular countries. There is no argument for or against international standardization as a generality but only in specific terms.

A comprehensive case for American business support of international standardization has not been made, nor has major U.S. government support been forthcoming. While U.S. industry does participate and has been increasing its

participation, only a tiny minority of U.S. companies do so. A brief analysis of ISO accomplishments suggests that the amount of effort to support international standardization is justified by the results. Weak American interest in ISO-IEC activity may simply reflect a pragmatic assessment of the relative gains and losses that might come about from participating and not participating.

It is unlikely that NBS can get broad Congressional and industry support to increase our limited effort in international standardization unless there is more clear-cut evidence that we are supporting a broad national interest rather than the collective private interests of specific U.S. industries. It might be possible to elicit support on a philosophical basis such as the promotion of international cooperation and harmony, or on the more pragmatic grounds that standards compatibility will foster U.S. trade and help stabilize the balance of payments.

Since there is no explicit statutory charge that NBS participate in international standards work, should it do so? Given that participation in international standardization can principally be justified as being concerned for promoting U.S. trade and only incidentally to foster U.S. knowledge of foreign technology, the case for NBS participation would be greatly strengthened if there were demonstrable evidence that the committee activity has some impact on enhancing or protecting U.S. trade interests. The NBS participant should also be clearly aware of his contribution for promoting U.S. trade interests.

An issue that raises the impact of international standardization to the forefront is the U.S.A. National Metric Study. An interim report from this study deals specifically with the effect of incompatibilities in measurement systems on the opportunities for harmonizing divergent national standards. A variety of motives for more effective U.S. participation in international standardization is discussed. A later phase of the metric study deals directly with the question of the dependence of U.S. trade balances on standards compatibility.

7.3 Department of Commerce Support of U.S. Involvement in International Standards Activities

During the past five years, the Department of Commerce has been a consistent, if low key, supporter of strengthening U.S. participation in international standardization. NBS was second only to the entire Department of Defense in numbers of ISO-IEC meetings attended by government officials during a 3-year period, 1965-68.

7.3.1 Legislation

Perhaps the principal tangible evidence for public support of international standardization was in the active support of legislation, H.R. 17424, and S. 3791 bills (89th Congress) to promote and support representation of U.S. interests in voluntary international commercial standards activities; subsequent legislation was proposed by the Department of Commerce, H.R. 1213 and S. 997 (90th Congress) with the added provision to establish a clearinghouse for the collection and dissemination of standards information and for other purposes. This legislation proposed in 1966-1967 would have authorized the Secretary of Commerce: "a) To make grants, enter into contracts or other arrangements, or modifications thereof, with any private, nonprofit standards organization or body which he determines represents the general interest of producers, distributors, users, and consumers within a specific industry throughout the country generally and which he deems has established adequate procedures to permit participation in the organization by these interests; b) to enter into contracts or cooperative arrangements with any public or private organizations, institutions, firms, ...to carry out any or all of the functions authorized herein..., c) to establish such policies, criteria, and procedures and to prescribe such rules and regulations as he may deem necessary...."

An ad hoc committee of the House Committee on Science and Astronautics held brief hearings on H.R. 17424 in 1966. There was general support from a limited number of companies and trade associations but the hearings reflect some opposition, generally from industrial proponents of the Department's Voluntary Product Standards Program. The State Department, General Services Administration, and the President's Special Assistant for Consumer Affairs in addition to the Department of Commerce, supported the Bill. The hearings generated virtually no industry support, especially from large exporters, and very little evidence of Congressional interest. There was some informal evidence that the Senate Commerce Committee did not favor these bills.

7.3.2 Concurrent Resolution

The failure of the Congress to consider favorably the above legislation prompted the Department of Commerce to seek alternative courses of action. In an effort to elicit from Congress some degree of approbation for promoting greater U.S. participation in international standardization, a Concurrent Resolution was drafted by NBS in 1968 for submission to Congress. The hope was that Congress would affirm that it was "the sense of Congress that the United States should participate vigorously and effectively in international standardization activities to promote compatibility between voluntary international standards followed in this country, and to facilitate broad domestic access to international trade."

The supporting material for the proposed Concurrent Resolution glosses over the fact that specific justification for U.S. participation frequently is unconvincing and is based on vague assurances that such participation is for the benefit of U.S. industry. The Bureau of the Budget circulated the proposed Resolution to the concerned government agencies for comment in FY 1969.

7.3.3 LaQue Report

The principal evidence of DOC concern for international standardization was the sponsorship of the Panel on Engineering and Commodity Standards, which resulted in the "LaQue Report," published in 1965. Among other things, the report pointed out the serious deficiencies of U.S. participation in international standardization and suggested steps which industry, trade associations, government, and specifically, the American Standards Association (the predecessor of ANSI) should take to assure the proper role of U.S participation in international standardization. The LaQue Report recommendations have been a significant cause for the marked increase of U.S. participation in ISO and IEC technical committees.

7.3.4 Interagency Committee on Standards Policy

A principal activity of this committee of representatives from twenty major government agencies interested in standards and standardization, has been a concern with various aspects of international standardization. A proposed policy for all government agencies interested in and affected by international standards is expected to be developed soon. This committee may provide the mechanism to coordinate the various views of government agencies on certain standards; this is especially important when no one agency would have a strong interest but collectively the U.S. government might.

7.3.5 Tri-Partite Agreement

The Department of Commerce in cooperation with the Department of State has vigorously questioned the adoption by certain European countries of procedures that could have the effect of seriously impeding U.S. exports to those countries. Briefly, the plan would provide a scheme whereby certain countries would accept a producer country certification of adherence to a standard in lieu of local testing of that product. As a nonmember, the United States would be put at a competitive disadvantage because its products would have to undergo local testing in each case; they also would not qualify for official procurement. Since the United States does not have a "national laboratory" to certify U.S. products and the member countries do, the effect would be to prevent prior guarantees of adherence to a standard which guarantee is available to member countries.

7.3.6 Latin American Fellowships

During his recent trip to Latin America, Secretary Stans has offered the facilities of NBS to ten standards engineers from Latin America. NBS has scheduled a planning seminar for all interested parties to implement a suitable training program for Latin American standards engineers. This activity may revive a previously close NBS relationship with COPANT, the Latin American regional standards body.

7.4 NBS Participation in International Standards Committees

Involvement by NBS staff in International Standards Committees ranges from nominal to substantial, reflecting both the interest of the staff and the activities of the particular Technical Committees. Data depicting the actual participation of NBS staff at ISO and IEC meetings during the past six years are set forth in Appendix E.

7.4.1 Reasons for NBS Participation

(a) Adjunct to Domestic Standards Committees

In general NBS participation on ISO and IEC committees reflects participation on a similar committee concerned with domestic standards. Thus, an NBS scientist participates on ASTM committee D-20, Plastics, and is a member of its subcommittee D-20.61, which also functions as the USA National Committee for ISO/TC 61 on Plastics. Similarly, an NBS scientist participates on five ANSI committees bearing on his international standards activity:

C 42	Definitions of Electrical Terms
C 61	Electrical and Magnetic Quantities and Units
Y 1	Abbreviations
Y 10	Letter Symbols
Y 32	Graphic Symbols and Designations

This involvement quite reasonably prompts acceptance of a leadership role as secretary of both IEC Committees TC 24, Electric and Magnetic Quantities and Units, and TC 25, Letter Symbols and Signs as well as membership on the USA National Committee for ISO/TC 12, Quantities, Units, Symbols, Conversion Factors, and Conversion Tables.

(b) NBS staff with special technical skills

NBS scientists and engineers also participate on ISO and IEC committees on an ad hoc basis, especially when the U.S. National Committee and/or its delegation to a meeting needs a unique or specialized technical input. Thus, an NBS scientist is a consultant to IEC/TC 61, Safety of Household Electrical Appliances, with a specific concern for current leakage. Likewise, during the past six years, NBS has sent five different persons from three different divisions, Mechanics, Analytical Chemistry, and Metallurgy, to seven meetings of ISO/TC 17, Steel, even though only one of these persons is on the USA National Committee for Steel. The special needs for the technical contributions of the other were required for specific technical problems.

(c) Limited industry support

NBS participates on committees representing the United States in those areas where the technical issues and benefits are so broad that no industry group or professional society feels that it can bear the financial costs of active participation. It is in these areas such as:

IEC/TC 3	Graphical Symbols
TC 24	Electric and Magnetic Quantities and Units
TC 25	Letter Symbols and Signs
TC 58	Methods of Measurement of Electrical Properties of Metallic Materials

where the role of government in representing a broad segment of U.S. industry might most reasonably be justified. NBS maintains the IEC secretariat for the latter three committees.

(d) Technology transfer

NBS also participates in certain international committees in order to become familiar with foreign technology. This is a principal reason for our participating in ISO/TC 59, Building Construction, and to a lesser extent with ISO/TC 92, Fire Tests on Building Materials and Structures.

(e) On contract

NBS also participates at the request of other government agencies, professional societies, or trade associations on a fully or partially funded basis. NBS participation on ISO committees has been externally supported during the past several years either fully or partially for ISO/TC 30, Measurement for Fluid Flow in Closed Conduits; TC 45, Rubber; TC 94, Fire Tests on Building Materials and Structures; TC 108, Mechanical Vibration and Shock; and TC 112, Vacuum Technology.

(f) As a government official

Most European standards organizations have a closer relationship with their respective governments than does ANSI or the IEC USNC with the U.S. government. Many European delegations have government officials as members, whereas the great proportion of U.S. delegates to ISO and IEC are representatives of manufacturers of the product or component under discussion. Our delegations sometimes seek out U.S. government participation because it tends to diminish the presumption of an exclusive business point of view from the United States. Thus, a case can be made that the U.S. delegation, which should reflect the position of the U.S. National Committee, should have a non-producer member.

7.4.2 Analysis of NBS Participation

7.4.2.1 Committee Meetings

Participation at standards meetings is a poor gage of interest for several reasons; some committees meet infrequently, yet still accomplish a great deal of work. Committees ISO/TC 36, Cinematography, and TC 42, Photography, for each of which ANSI provides the secretariat, are very productive and yet meet infrequently. ISO/TC 97, Computers and Information Processing, on the other hand, is very active and yet has not developed many standards. NBS staff are active on both committees.

During the past six years NBS staff were relatively active in the following ISO committees: TC 1, Screw Threads; TC 6, Paper; TC 17, Steel; TC 24, Sieves; TC 36, Cinematography; TC 42, Photography; TC 45, Rubber; TC 61, Plastics; TC 94, Fire Tests on Building Materials and Structures; TC 95, Office Machines; TC 97, Computers and Information Processing. NBS activity on TC 39, Machine Tools, will diminish due to a retirement and participation on a TC 92 subcommittee on seat belts, and TC 106, Dentistry, is no longer funded by OESL since NBS does not generally support international standards travel for other agency programs.

Actual participation at international standards committee meetings is easy to record, but it is much more difficult to evaluate the accomplishments of a particular meeting or the background work that may be undertaken by persons not on the official U.S. delegation. Thus, participation at international standardization meetings should be understood as only a gross measure of NBS involvement. U.S. participation at ISO and IEC committees entails a heavy travel expense since virtually all meetings are held in Western Europe to minimize total travel costs. Of the more than 400 meetings held during 1969, 34 were held in Japan and North America; all others were held in Europe.

7.4.2.2 NBS Leadership in Secretariats

NBS leadership in international standards is strongest where Bureau staff maintain the secretariat of major committees; NBS staff are the secretariat of IEC committees TC 24, 25, and 58, and one subcommittee, TC 46B. NBS does not maintain any active chairmanships or secretariats of ISO committees or subcommittees. An NBS scientist does function as the titular secretary of ISO/TC 66, Measurement of Viscosity; this committee has been inactive pending development of an internationally agreed upon test method for determining

viscosity. NBS scientists and engineers are active as secretariats of working groups or task forces, but accurate data on NBS initiative at this level are not readily available as the life of most working groups is only one year. Also, there is only limited data relative to NBS activity on domestic standards committees which maintain subcommittees responsible for representing the U.S. position at international meetings.

NBS participation in IEC is much more concentrated, reflecting our secretariat functions and the fact that IEC committees tend to meet at least annually. NBS maintains the Secretariats of IEC/TC 24, Electric and Magnetic Quantities and Units; TC 25, Letter Symbols and Signs; and TC 58, Methods of Measurement of Electrical Properties of Metallic Materials; as well as that of TC 46B, Waveguides and Their Accessories. The first three are concerned with technical matters which affect large segments of U.S. industry but no one industry to a sizable extent. Thus, the USNC and the IEC look to NBS for leadership in these areas. NBS activity in TC 29, Electro-Acoustics, reflects an NBS scientist's chairmanship of ANSI S1, Acoustics, sponsored by the Acoustical Society of America, which has a principal responsibility of preparing U.S. technical positions and delegations for IEC/TC 29, ISO/TC 43, Acoustics, and ISO/TC 108, Mechanical Vibration and Shock.

Information on NBS participation on IEC and ISO committees does not reflect participation at any meetings which were held in the United States nor NBS backup work such as that for IEC/TC 61 or ISO/TC 66 as previously described. In summary, NBS has been reasonably consistent in our participation. A review of the entire list of ISO and IEC committees, however, would suggest that NBS could become much more active in international standards work if there were proper reasons and funds.

7.4.2.3 Costs of NBS Participation in ISO-IEC

Accurate cost data for NBS support of ISO-IEC standardization are difficult to determine; costs pertaining to meetings alone, however, are estimated at $200 per man-day assuming an average number of five days or $1,000 salary and overhead. The average NBS participant at a meeting is a senior GS-15. Data on travel costs, averaging about $750 per trip, are fairly accurate because it is accounted for separately. No attempt is made to calculate the cost of preparation and follow up for each meeting, but participants remark that this work is often quite extensive.

Estimated Costs of NBS Participation
at ISO-IEC Meetings

	FY 67	FY 68	FY 68	FY 70
NBS Participants	31	29	23	20
Salary and Overhead	$31,000	$29,000	$23,000	$20,000
Travel	$24,200	$21,600	$21,400	$15,000
Total	$55,200	$50,600	$44,400	$35,000

7.5 NBS Involvement in International Standardization Policy

7.5.1 General

There have been some informal attempts during the past several years to inject NBS and the Department into policy matters concerning international standardization including the introduction and support of legislation to promote greater U.S. participation on standards committees. A brief analysis of U.S. participation in ISO committees relative to our export trade was undertaken by Department BDSA-BIC staff with the idea of spurring participation in international standards committees of those industries which had a substantial export market but were not participating on the specific ISO technical committee concerned with their product. An outgrowth of this informal study was a meeting with ANSI and USNC officials and Dr. Kincaid; it resulted in NBS agreeing to contact six industry trade associations, both formally and informally, to promote research into the degree to which international standards did or might in the future hinder their markets in countries which adopted standards different from U.S. practice.

As a result of DOC impetus, the Airconditioning and Refrigeration Institute agreed to review the annual reports of ISO committees concerned with pumps and compressors and discuss the prospects of initiating participation, while another trade group in the compressor industry declined. The National Canners Association agreed to expand their limited interest as did the American Plywood Association. There were certain committees for which there were no trade associations concerned including sawn timber and horology. Another trade association showed virtually no interest in studying the actual or potential impact of international standards. In the latter instance a formal request from Assistant Secretary Kincaid to the American Textile Machinery Institute to review the ISO committee records with or without Commerce foreign trade experts resulted in a short, negative reply. Ironically, the ISO committee concerned is the fifth most active in developing standards. Although

U.S. exports of textile machinery are declining in the face of rising U.S. imports, there is no evidence that adoption of these standards are hurting American sales.

7.5.2 Involvement in IEC-ISO-COPANT Policy

7.5.2.1 IEC

NBS and the Department do participate in developing policy for the USNC/IEC. Not only does NBS staff three IEC committee secretariats but several staff members function as Technical Advisors, senior officials for the U.S. committee concerned with developing U.S. positions for their respective IEC committees. Further, the Director of the Office of Product Standards has been a member of both the USNC and its executive committee. One NBS staff member is an elected member-at-large of the USNC.

7.5.2.2 ISO

There is no ANSI committee broadly concerned with ISO activities similar to the USNC for IEC standardization. Dr. Branscomb, as member of the ANSI Board, has an opportunity to express opinions on international standards. Dr. Branscomb has designated Dr. Astin to be a special advisor to him on international standardization. In addition to Dr. Astin's long familiarity with ANSI and its predecessors, he participates on the ANSI Long Range Planning Committee which has a concern for international standardization.

The seventeen ANSI Technical Boards also have some opportunity to exercise policy over those U.S. National Committees of ISO which come under their jurisdiction. NBS staff participate on seven of these Technical Boards.

7.5.2.3 COPANT

NBS and the Department of Commerce have been involved in COPANT policy matters to a limited extent. Both NBS and Commerce representatives have participated at ANSI policy meetings concerning COPANT activities. The recent initiative of Secretary Stans to confer ten standards fellowships on Latin American standards engineers for training at NBS may revise our present limited involvement.

7.6 NBS Management of International Standards

There is virtually no coordinated management of the NBS involvement in international standardization except in the control of travel funds by OESL. As

noted earlier, NBS staff and their supervisors essentially decide themselves how and when they participate on various technical committees, although OESL acts as a general promoter of appropriate NBS involvement.

One important point should be cited here. Technically, there are no personal memberships in ISO or IEC international committees. Each national member chooses delegations for each meeting of each ISO and IEC committee on which that nation wishes to participate. On the practical level, since there is little competition for the positions, U.S. National Committees make it a practice of permitting attendance by any technically competent person. Thus, NBS participation on a U.S. National Committee of ISO or on a delegation to an ISO or IEC meeting is almost assured if we wish to nominate a member or delegate. There are relatively few persons or organizations concerned with the attitudes of consumers or general interest representation on these committees, and those that are concerned do not care enough or cannot afford to send delegates to meetings.

7.6.1 OESL Policy

OESL developed an informal policy of supporting only ISO-IEC standardization activities, with virtually no exceptions, when foreign travel funds were reduced. Since travel funds for scientific society meetings, some of which are concerned with developing standards, were not managed by OESL, this had only a nominal effect on NBS participation on those committees which were concerned with standards. Also, the use of NBS funds to support participation on committees dealing exclusively with subject matter in which NBS work is supported by other government agencies, i.e. the ISO/TC 94 subcommittee concerned with safety of automotive seat belts, and ISO/TC 106, Dentistry, were eliminated. Only one person was allowed to attend a specific meeting and special consideration was to be given before an individual could make more than one trip to a standards meeting abroad each year. Each of these restrictions was negative and somewhat arbitrary but they eliminated a sufficient number of requests.

OESL has a concern for fostering U.S. exports and where possible promoted NBS participation on committees dealing with products heavily exported from the United States. Likewise, participation at technical committee meetings was discouraged if the United States had no demonstrable export trade interest in the matter covered by a particular committee, except in the case of those committees concerned with systems, units, and other priorities of special NBS responsibility (see p. 148).

7.6.2 Restriction of Travel Funds

Although official encouragement of Department of Commerce involvement in international standards work has increased during the past several years, travel support available to OESL has decreased from approximately $25,000 in FY 67 to $16,000 in FY 70 so that increasingly stringent controls had to be enforced. Unfortunately, without the benefit of a coherent policy for NBS participation in international standardization, the OESL policy has been informal and unevenly applied.

7.6.3 Special Problems

Special problems were posed by those individuals who maintained secretariats since they frequently want to make more trips than is typical of NBS staff. NBS is exceptionally active in ISO/TC 97, Computers and Information Processing, nine persons having made fourteen trips in the past five years and ISO/TC 95, Office Machines, with two persons making six trips in three years. TC 97 is structured into some twenty distinct committees and subcommittees, many of which meet regularly, and NBS staff often wish to attend.

Any cutback in NBS support of secretariat travel and participation in TC 95 and TC 97 would hamper efforts to exert NBS leadership in these areas. NBS participation on ISO/TC 97 and IEC committees has absorbed 50% of all OESL funds available for foreign travel in the past several years. Requests by the Center for Computer Sciences and Technology for travel funds for FY 1971 alone, equal all the travel funds available to OESL for FY 1970.

7.6.4 Support for NBS participation

Special consideration has been given to those who can get partial travel support from other government agencies, professional societies, or trade associations. Requests which included vacation overseas and/or trips on NBS business supported by personal or non-OESL funds and resulted in the opportunity to get excursion rates were also encouraged--anything reasonable to support more trips to standards meetings. Meetings in Western Europe were more favorably considered compared to those who wished to travel to Japan or the Soviet Union solely because of cost considerations.

7.6.5 Priorities

This is the most difficult problem in reaching decisions as to whether or not NBS personnel should participate as delegates to international standards

committees. Requests include persons wanting to participate on committees concerned with screw threads, paper, plastics, nuclear energy, computers, and others.

While a principal DOC concern should be that of enhancing U.S. exports or improving U.S. industry's competitive posture, information on the contribution of NBS participation was not readily available. In the absence of a strong export rationale, NBS participation was based on the specific need for the individual NBS scientist or engineer.

Sometimes the existence of high priority is obvious (e.g., the development of standards of SI usage by industry, or agreement on standard electrical measurements). This type of activity has very broad impact on almost every industry so that support from any one industry group is difficult to elicit. Often, however, importance of an international activity or the lack of it is far from clear. The benefits of a particular standards activity are often stated categorically, with little substantive backup. To develop quantitative justification based on more than opinion is not easy, and is often very difficult.

7.6.6 Evaluation

Trip reports by staff participating on ISO and IEC committees are required. They are synopses of the technical issues discussed at meetings and in the absence of good criteria for participation, evaluation is difficult. The breadth of coverage on different reports ranges from virtually nothing to comprehensive.

It is perhaps significant that an OESL review of NBS trip reports over a five year period shows that only two persons mentioned the possible impact of international standards on U.S. exports. On this basis it is reasonable to assume that NBS personnel function as scientists and engineers concerned almost solely with the technical aspects of standards.

7.7 Accomplishments of ISO and IEC

No valid, general evaluation of the total output and impact of ISO and IEC standardization has yet been made, but to argue forcefully for promoting greater U.S. involvement demands that attempt. A legitimate assessment of Technical Committees would embrace a wide consideration of what each member country expects, the contributions of each, etc. For our purposes we will cite general data simply to provide a feel for the extent of ISO-IEC Standardization.

Numbers of standards published by each ISO committee are set forth in Appendix E as is the year of the most recent standard, if more than three years have elapsed since one has been published. U.S. participation on each committee is also noted. Standards published by IEC committees during the 1964-8 period reflect a much more consistent pattern of productivity. Only three committees which had been organized for many years failed to generate a new standard. Many were quite active.

7.7.1 ISO Accomplishments

Judging committee activity and productivity solely on the basis of numbers of (standards) recommendations published is dangerous and yet some generalizations might be made. There is a great variation in the numbers of standards produced by each committee but there is a general lack of productivity by more than half of the committees. This fact can reflect among other things: (1) the needs falling within the scope of specific committees are small, (2) leadership (the Secretariat) is lacking, (3) practices in different countries are so diverse that production of one voluntarily accepted international standard is very difficult, etc. One could presume, however, that something is wrong with the ISO/TC 15, Couplings, and ISO/TC 21, Fire Fighting Equipment, committees formed more than 20 years ago, since no standard has been produced for either committee. Similarly, with the world wide use of agricultural equipment and the great number of manufacturers in many countries with broad product lines, one might reasonably conclude that TC 22T, Agricultural Tractors, and TC 23, Agricultural Machines, should have developed more than four standards in more than 20 years.

The data in this tabulation dramatically point out the difficulty of arguing the importance of ISO standards.

	ISO Recommendations (Standards) Published						
No. of Standards:	none	one	2-5	6-10	11-20	21-40	41-71
No. of Committees:	43*	19	26	12	9	15	6

* Includes 12 committees formed during the past 2 years.

It is difficult to understand how thirty-one committees which have been working at least two years and many for well over a decade could not develop one standard. That nineteen have developed one standard is not more encouraging. Thus out of 130 ISO committees almost 50% have published one or no standard. This would appear to be inconsistent with the position that international standards are critical to international commerce. Over the past five years, NBS staff members have participated on five committees which have produced zero or one recommendation. The average output of the 25 committees with NBS participation has been 17 recommendations.

7.7.2 IEC Accomplishments

Though the IEC came into being in the early 1900's substantial activity did not get underway until the mid 1950's. A review of the catalog suggests a fast growth as standards in print now, dated by year of publication, are as follows:

Year(s)	Number of Standards
1925-1956	7
1957	6
1958	7
1959	10
1960	8
1961	8
1962	11
1963	20
1964	11
1965	26
1966	37
1967	38
1968	52
	241

Many of these documents are highly technical and quite lengthy, some having several supplements which are revised periodically.

It should also be noted that some of the standards published during the past fifteen years were revisions of earlier standards.

	IEC Standards Published					
No. of Standards:	none	1	2-5	6-10	11-20	21-30
No. of Committees:	15	7	26	7	8	2

Twelve of the fifteen committees which have not yet published any standard have been formed during the past several years.

7.7.3 Secretariats

The matter of secretariats is frequently cited as a measure of a nation's leadership or involvement in international standardization. The job of secretariat of an ISO-IEC technical committee can be an extremely important one since it is the secretary who is the one person responsible for committee progress. While the secretary himself must maintain strict neutrality, his nation's delegation has the most advantageous position since in the drafting of initial documents and in analyzing and consolidating comments from the committee's member countries, the secretary has the opportunity to give maximum weight to his own country. The secretariats of full committees, subcommittees, and working groups held by NBS staff tend to be those which are not oriented towards specific products. The United States (ANSI) has the secretariat of fourteen full technical committees (third place) and sixteen subcommittees (fourth place) for a total of thirty. Only the United Kingdom with seventy, France with sixty-six and Germany with thirty-one exceed the United States.

The role of the United States is similar in IEC where the USNC maintains eight secretariats (second place) of full committees (including three held by NBS) and thirteen subcommittees (third place) (including one held by NBS) for a total of twenty-one. The United Kingdom with a total of twenty-seven, France with twenty-five, and the Netherlands with twenty-three, exceed the United States. The relative importance of the number of ISO and IEC secretariats maintained by the United States vis-a-vis other nations or blocs of nations is not clear. While the U.S. position numerically is substantial, especially in IEC, it is a relatively recent phenomenon. There is some evidence that the Common Market (EEC) and the Outer Eight (EFTA) countries are or will be cooperating much more closely in harmonizing standards of their respective countries soon. Such activity may very well reduce the impact of the fourth place U.S. position in total numbers of secretariats held in ISO and IEC, and if one contemplates block voting among EEC and EFTA countries or counts in units of population or GNP, or even per unit of foreign trade. The position of the U.S., as measured by ISO and IEC secretariats, is overwhelmed by Europe.

7.7.4 An Analysis of ISO Secretariats Held by the United States

A consideration of the ISO committees of which the United States has the secretariat function should illustrate the necessity for more careful review of the merits of this alleged leadership position. U.S. assumption of the secretariat position could be asserted to be prima facie evidence of this nation's concern for the subject matter if for no other reason than the cost of maintaining the secretariat and the responsibility due to other nations concerned with the matter. A review of the accomplishments of these ISO committees cast doubt on the extent or nature of this concern.

U.S. Secretariats of ISO Committees

Committee No.	Title	Published Recommendations
11	Boilers and Pressure Vessels	1
28	Petroleum Products	1
31	Tires, Rims, and Valves	-*
36	Cinematography	29
42	Photography	26
61	Plastics	69
66	Determination of Viscosity	-
85	Nuclear Energy	2
97	Computers and Information Processing	17
104	Freight Containers	3
108	Mechanical Vibration and Shock	-
122	Packaging	-
127	Earth Moving Machinery	-*
131	Fluid Power Systems/Components	-*

*New Committees

The evidence seems to be to the contrary. Only for TC 36, TC 42, TC 61, and TC 97 is there any evidence of substantial productivity. A recent suit, filed by the Justice Department against the American Society of Mechanical Engineers (ASME), alleges that the Society administered a scheme to prevent imports of boilers or pressure vessels into the United States. This charge against ASME, which maintains the secretariat of TC 11, suggests that the production of one standard by TC 11 is consistent with a policy of not developing standards acceptable to all countries. The TC 28 secretariat, sponsored by the American Petroleum Institute, did not convene a meeting during a five-year period of time. This inactivity and the development of one standard also suggests no sense of urgency on the part of the secretariat to develop standards. Likewise, the full committee of TC 85 did not meet during a seven-year period. The apparent inactivity of TC 66 is more

reasonable. An NBS scientist is Chairman of a section of an ASTM subcommittee which also functions as the USA National Committee for TC 66. He has been developing a proposed standard based on laboratory experimentation for several years; the proposal will soon be submitted to committee members. The proposed work of TC 108 was financed for several years by a U.S. government agency but no standard has yet been produced. The remaining committees, TC 31, 122, 127, and 131 were established less than five years ago and so the lack of results is much more reasonable. This pattern of no progress could be interpreted to mean that the lack of international standards might well be the goal of certain U.S. interests.

7.8. Summary and Recommendations

Arguments for U.S. participation in voluntary international standards committees have largely been based on principle rather than fact. A casual review of ISO and IEC activities and accomplishments with and without U.S. participation suggests countless contradictions. One will note that certain committees meet annually and in some cases more often; a few accomplish a great deal while others seem to accomplish nothing. Other committees meet infrequently and accomplish much although this is the exception.

The United States participates on most ISO and IEC committees although the manner of participation varies. One or two delegates may attend each technical committee meeting; they may be different delegates at each meeting or their attendance may extend for years. Certain committees are able to consistently attract U.S. delegations of 15-20 delegates although most delegations are less than five members.

Most delegates are employed by a small group of very large companies with sizable foreign interests although many similar U.S. firms do not participate at all. Delegates also come from small companies, trade associations, professional societies, and government agencies, but only rarely from universities.

The standards themselves range from the innocuous to the complex. Sometimes the standard reflects U.S. practice exactly and other times the standard is a compromise. (An analysis done for the U.S. Metric Study evaluates the extent to which ISO recommendations are consistent with U.S. domestic standards). Occasionally, the ISO or IEC standard is reflected in U.S. practice.

While most of the developed and developing nations are members of ISO and IEC, virtually the only participants at meetings are Europeans, delegates

from Western Europe most often. The United States is the only regular participant from the Americas, Canada participating to a more limited degree. Japan is the only regular Asian participant.

7.8.1 NBS Participation

The matter of NBS participation at ISO and IEC committee meetings is a present problem and needs to be dealt with now. It should be recognized that at present, the best rationale for NBS participation at these meetings is predicated on the industry representatives' having made a good case for their involvement and that NBS cooperation enhances the U.S. trade interests. As was mentioned earlier, virtually no reference has been made to the actual or possible impact of NBS participation on U.S. exports. Certain general and specific reasons have been advanced in support of NBS participation. They range from the concern of scientists and engineers seeking a common engineering language to the standards responsibilities deriving from the Brooks Bill. Perhaps, the best argument, though one most difficult to sustain, is the fact that international agreement per se will tend to enhance the prospects for world peace.

While the general rationale for international standards may be for harmony, the specific reason for which a nation's delegation participates or should participate is to advance or protect the interests of its country. Europeans participate because this is a step toward integration of the European market by removal of one kind of nontariff barrier. Motivation for United States participation, however, must come mainly from a national requirement to maintain the balance of payments, for which a favorable balance of trade is necessary. Only about 5% of U.S. products are exported, not enough to convince most individual companies that international standardization efforts and expenditures are necessary. Thus a concern for the impact of standardization on exports is a special concern of the Federal government, and particularly of the Department of Commerce.

Another argument based on principle rather than on demonstrated evidence is that the United States should participate actively in ISO and IEC activities because of the very size of our export trade. This position implicitly acknowledges the ability of U.S. industry to take care of its international standards interests yet urges involvement as a sort of social responsibility. NBS participation should be encouraged in those areas where the United States at large has an interest and where no one else is likely to assert a U.S. position. NBS support for standardization of products or components can be justified on the limited basis of affording industry a two or

three-year subsidy. Thus, for an industry unfamiliar with the actual or potential impact of international standards, NBS might assert the initiative until that industry can make an evaluation of the worth of its participation. NBS should be willing to cooperate with professional societies and other government agencies in representing U.S. interests. More rigorous consideration should be given to NBS participation at a particular meeting in behalf of a company, industry, or trade association. All such participation should be predicated on some reasonable trade interests of the United States.

Special consideration ought to be given to NBS participation on those committees which are more concerned with scientific standards or the transfer of technology. Thus, NBS participation on committees concerned with Acoustics (IEC/TC 29 and ISO/TC 43), Vacuum Technology (ISO/TC 112), etc., ought to be considered on the basis of different criteria than the possible impact on U.S. exports, namely concern for international compatibility of the system of physical measurements.

7.8.2 U.S Participation in ISO/IEC

In an effort to provide a rational basis for determining the proper level of U.S. participation in ISO and IEC technical committees, the Department of Commerce should take the lead in developing a series of pilot studies involving NBS personnel, Department of Commerce economists, industrial representatives, and ANSI officials to establish the feasibility of collecting sound information which would point definitely toward or away from international involvement in specific industrial standardization areas. The Panel notes with interest the initiation of a comprehensive ISO study on the impact of international standards.

7.8.3 ISO Study of the Impact of International Standards

A study of the economic effects of international standardization on world trade has just been initiated by the International Organization for Standardization. The evaluation is expected to cover the following:

The economic effects of introducing international standards into national standards.

The role of international standardization in regional markets such as the Common Market and the Latin American Free Trade Area.

The efficiency of international standardization in eliminating obstacles to international trade arising from differences in national regulations especially in matters of safety.

Disadvantages resulting from the lack of international standardization. The effects on developing countries following their participation in international standardization.

Responsibility for the study has been assigned to ISO's Standing Committee for the Study of Principles of Standardization (STACO). STACO plans to survey all ISO Member Bodies and various international organizations concerned with the promotion of international standardization.

The Chairman of this Committee indicated that many knew "that the economic benefits of standardization are very great, but we need to collate the concrete evidence of those benefits. This information will not only help in the assessment of priorities in international programs, but will also provide a valuable aid in promoting the concept of standardization among those who still do not realize its importance in the modern world."

The Panel is not aware of any other study concerning the general or the specific nature and effect of international standardization. The fact that this study is underway more than sixty years after the IEC came into being and some forty-four years after the predecessor of ISO was formed suggests a collective act of international faith in a costly and time consuming activity. Judging by the numbers of technical committees and numbers of standards promulgated, the general assertion that "the economic benefits of standardization are very great" is courageous if not presumptuous. Nonetheless, the progress that has been made has been based on continually repeated decisions by commercial organizations to spend their money supporting the present level of activity. These organizations must have felt that the long term benefits of international standardization outweighed the cost.

Chapter 8
Special Case of the NBS Voluntary Product Standards Program

8.1 History

Brief descriptions of the funding and staffing of the Office of Engineering Standards Services (OESS) which manages the Voluntary Product Standards (VPS) program for the National Bureau of Standards have already been given in Chapter 3. The activity of this office began at NBS in 1921 with the establishment of the Division of Simplified Practice. The recommendations for simplified practice produced by this Division provided for the voluntary reduction of the number of sizes and varieties of many products. This activity led a massive national drive for standardization. In 1927 the scope of this activity was broadened to include the development of commercial standards. These standards were developed with the cooperation of industry to establish quality requirements for specific products. In 1950 the two divisions involved in this activity were merged into one and transferred to the Office of Domestic Commerce. This division was again transferred within the Department of Commerce in 1953. In 1963 a reorganization resulted in the activity being transferred back to NBS. One of the main reasons for this last move was to strengthen the technical content of the program. At this time it was also decided to combine the two types of standards into one type called Product Standards.

8.2 Procedures

As a result of the recommendations of the LaQue Panel in 1965 the procedures that were used in the VPS program to process a standard were made more rigorous. These new procedures, amended in 1968 and 1970, set forth the consensus requirements for all "affected" parties, the role of OESS, the role of industry, and the criteria for these standards. These procedures include:

8.2.1 Requirement for Participation

The Office of Engineering Standards Services will participate in the development of a Voluntary Product Standard if it:

1) Is likely to have national effect or implications;
2) Reflects the interest of an industry or organization concerned with the manufacture, production, packaging,

distribution, testing, consumption, or use of the product, or the interest of a Federal or State agency;

3) Would not duplicate a standard published by, or actively being developed by, a private national standardizing body unless such duplication was deemed to be in the public interest; and

4) Cannot be processed according to the needs or the desires of the proponent group by a private national standardizing body.

8.2.2 Role of OESS

OESS assists in the establishment of a Voluntary Product Standard by:

1) Acting as an unbiased coordinator in the development of the standard;

2) Providing editorial assistance in the preparation of the standard;

3) Supplying such assistance and review as is required to assure the technical soundness of the standard;

4) Seeking satisfactory adjustment of valid points of disagreement;

5) Determining the compliance with the criteria established in these procedures;

6) Providing secretarial functions for each committee appointed under these procedures; and

7) Publishing the standard as a public document.

8.2.3 Role of Producers, Distributors, and Users

Producers, distributors, users, consumers, and other interested groups may contribute to the development of a Voluntary Product Standard by:

1) Initiating and participating in the development of the standard;

2) Providing technical or other relevant counsel relating to the standard;

3) Promoting the use of, and support for, the standard; and

4) Assisting in keeping the standard current with respect to advancing technology and marketing practices.

8.2.4 Initiation and Development of a Proposed Standard

The Department of Commerce may initiate the development of a Voluntary Product Standard if such action is deemed to be in the public interest. A standard initiated by the Department is processed in the same manner, and is subject to the same requirements, as one initiated by a proponent group. A proposed standard:

1) Shall be based on adequate technical information, or adequate marketing information, or both;
2) Shall not be contrary to the public interest;
3) Shall be such that conformance with it can be determined by inspection or other procedures utilized by either an individual or a testing facility competent in the particular field;
4) Shall follow the prescribed form;
5) Shall include performance requirements if such are deemed to be technically sound, feasible, and practical, and the inclusion of such is deemed to be appropriate; and
6) May include dimensions, sizes, material specifications, product requirements, test methods, and installation procedures.

A proposed standard that meets the above criteria may be subject to further review by an appropriate individual, committee, organization, or agency not associated with the proponent group. It may also be circulated to appropriate producers, distributors, users, consumers, and other interested groups for consideration and comment as well as to others requesting the opportunity to comment. The proponent group or appropriate committee which drafted the initial proposal shall consider all comments and suggestions received and may make such adjustments as are technically sound and are believed to cause it to be generally acceptable.

8.2.5 Standard Review Committee

At this point OESS will establish a Standard Review Committee consisting of qualified representatives of producers, distributors, and users or consumers of the product and other appropriate general interest groups such as State and Federal agencies. This ad hoc committee may conduct business either in a meeting or through correspondence. If the committee finds that the proposal meets the requirements set forth above, it may recommend that

the proposal be circulated for acceptance. If, however, it finds that the proposal does not meet these requirements it shall, in consultation with the proponent group, change the proposal. The recommendation of a proposal by the committee must be approved by at least three quarters of all of the voting members.

8.2.6 Procedures for Acceptance of a Recommended Standard

Upon receipt from the Standard Review Committee of a recommended standard, the Department of Commerce shall give appropriate public notice and distribute the recommended standard for acceptance. Such a distribution is made to a list compiled by OESS which in their judgment is representative of producers, distributors, and users and consumers. Distribution for comment is also made to any party filing a written request and to other parties that OESS deems appropriate. If the results of these distributions indicate that the recommended standard is supported by a consensus, it will be published as a Voluntary Product Standard. "Consensus" means general concurrence and no substantive objection that is deemed valid. A recommended standard shall be deemed to be supported by general concurrence by either of two sets of requirements:

1) Acceptance of not less than 70 percent by the producer segment, the distributor segment, and the user segment, each segment being considered separately, and an average acceptance of the three segments of not less than 75 percent. Acceptance by volume of production and distribution of not less than 70 percent in each case may also be required.
2) Acceptance of not less than 60 percent by each of the three segments and an average acceptance of not less than 66 2/3 percent. Acceptance by volume of the production and distribution segments of not less than 60 percent may also be required. In addition, the recommended standard must be reaffirmed by the Standard Review Committee and the Department of Commerce will conduct a public hearing to assist it in determining whether publication is in the public interest.

If the recommended standard is not supported by a consensus it may be returned to the Standard Review Committee for further action, the

development of the standard may be terminated, or other action may be taken as deemed necessary or appropriate.

8.2.7 Standing Committee

A Standing Committee shall be established prior to the publication of the Voluntary Product Standard. This committee may include members from the Standard Review Committee and operates under the same rules. The purpose of this committee is to keep itself informed of any advancing technology or marketing practices that might affect the standard, receive and consider proposals to revise the standard, and make recommendations concerning the desirability or necessity of revising the standard.

8.2.8 Review of Published Standards

Voluntary Product Standards are reviewed by OESS with the assistance of the Standing Committee within 5 years of publication or last revision and at least every 5 years thereafter. The purpose of this review is to determine whether the standard has become obsolete, technically inadequate, no longer acceptable to or used by the industry, or inconsistent with law or established public policy. If any of these conditions is found to exist, the standard will be amended, revised, or withdrawn. Public notice of intent to withdraw is given and a 30-day period provided for the filing of objections.

8.3 Technical Areas Covered by Voluntary Product Standards

Table 8.1 indicates the Technical areas in which Voluntary Product Standards were either approved, revised, or are in process of approval in the period since 1963. These standards are especially concentrated in the building construction area and in the plastic product area. Possible reasons for these concentrations are: within these technical areas there are a large number of small producers, within the building construction area there is a need for voluntary standards to be referenced in codes and Voluntary Product Standards are quickly accepted for this purpose, and the plastic product area is a relatively new industry seeking to overcome the competitive advantage of established materials.

Table 8.1 Technical Areas in Which Voluntary Product Standards Were Published Since 1963 or Are Currently Processed

	R[a]	CS[b]	PS[c]	Total
Building Products				
Heating	1	4		5
Lumber	3	4	6	13
Millwork		8	4	12
Plastics		2	14	16
Plumbing Materials and Fixtures		3	4	7
Metal	1	7	5	13
	5	28	33	66
Plastic Products		6	17	23
Miscellaneous				
Apparel		1	5	6
Hardware and Tools	6	3	21	30
Packaging			24	24
Paper Products	1	1	3	5
Textile Products		1	3	4
Mineral Materials		2	3	5
School Supplies	1		5	6
	8	8	64	80
	13	42	114	169

[a]R = Simplified Practice Recommendations

[b]CS = Commercial Standards

[c]PS = Product Standards (includes those standards that are in process).

8.4 Work Load of OESS on Voluntary Product Standards

Table 8.2 indicates the number of standards that have either been developed, revised, or are in the process of development by OESS since 1963. During this period the processing of 33 standards was stopped because they duplicated ASTM and ANSI standards and 34 others had to be resubmitted to their Standard Review Committees and to their acceptors because of a change in program. In general, the restrictions under which the program operates have been increased in recent years which have tended to slow the process. It is estimated, however, that 35 Voluntary Product Standards will be approved in 1971. During the last few years additional efforts have also

been made to keep the listed standards up to date through review procedures. In 1969, for instance, 94 standards were reviewed.

Table 8.2 Annual Production of Voluntary Product Standards

	Simplified Practice Recommendations	Commercial Standards	Product Standards	Total
1963	11	19		30
1964		9		9
1965	2	11		13
1966		3	7	10
1967			1	1
1968			1	1
1969			10	10
1970[a]			27	27

[a] 16 approved for publication as of September 1, 11 additional standards (est) to be approved this year

8.5 Additional Activities of OESS

8.5.1 Fair Packaging and Labeling Act

According to Section 5(d) of the Act, whenever the Secretary of Commerce determines that there is undue proliferation with respect to packaging of a consumer commodity he shall request manufacturers, packers, and distributors to participate in the development of a standard for that commodity under the procedures for the development of Voluntary Product Standards. This request is made with the threat that if the industry does not cooperate legislation may be enacted to provide regulatory authority to deal with the situation. So far, this Act has created in 6 industries an interest in voluntarily reducing the proliferation of packages.

8.5.2 Information Services

A collection of 19,000 standards published by more than 350 domestic trade, professional, and technical societies enables OESS to function as a reference library and to operate a referral activity. In this respect, questions about the existence and availability of standards, but not about their technical adequacy, can be answered. Copies of the standards are not

supplied but a KWIC (Key Word in Context) Index of them will soon be available as an NBS Special Publication. In using this Index a key word will identify the standards of interest, the dates of publication, and the organizations publishing them.

8.6 Discussion of Contentions

One of the Panel's guest speakers took the position that the National Bureau of Standards should do away with the VPS program as its output of standards is rather narrow and involves specific fields, whereas NBS should be concerned with broad problems in areas of general concern. This speaker also felt that many of the groups that use the VPS programs do so to obtain protection from antitrust laws. Another speaker expressed the view that those groups using the VPS program do so to obtain a free financial ride. Both speakers believed that these groups could easily use the private system (ANSI) if they chose. The LaQue Panel in 1963, also contended that some groups use the program because they feel that the standards have a quasi-governmental status which helps their product gain quick approval as complying with Building Codes.

These contentions are not new and many efforts to end the VPS program or to have it transferred to the private system have brought out persuasive and successful protest by interested and concerned groups. The contentions of these groups as stated by several other of the Panel's guest speakers include the point that the private system as now constituted is not capable of processing standards for consumer products. This group also contends that standards promulgated by ANSI are not effective National Standards.

As indicated in Chapter 2, the activities of the private system that are directed toward the development of consumer standards are practically nil. This failing has recently attracted the fire of the President's National Commission on Product Safety. It thus appears that perhaps both sides have some truth in what they claim.

This leads us to some basic questions: What role should the VPS program play in the voluntary standardization system? Should the VPS program only be used to develop standards that private bodies cannot develop? Should the program be available to all parties that comply with the procedural requirements or should OESS make a real effort to encourage industries to use the private system?

According to the procedures for processing a proposed Voluntary Product Standard, action may be taken by OESS if among other requirements, such action is deemed to be in the public interest and if the proposal cannot be processed according to the needs or desires of the proponent group by a private national standardizing body. The latter requirement offers a safety valve mechanism for the standardization system. Such a situation in fact, would sometimes be sufficient to establish the proposal as a social need as defined in Chapter 5. In the case of the first requirement, the only test that the proposed standard must pass is that it is not contrary to the public interest (See 8.2.4). A result of this policy, or lack of clarifying specifics, is that some standards have been approved that may have little to do with significant public interests. There are, thus, no official guidelines that can be used to direct the VPS program into the area of social need standards except for those proposals that may now be initiated by the Department.

It has become apparent to members of the Congress, to the National Commission on Product Safety, and to various offices in the Executive Branch of Government, that the total standardization needs of this nation have not been satisfied. In relation to consumer products, it has been pointed out that the private voluntary standardization groups have not met the needs of the general consuming public by providing standards that establish requirements for specific products.

The National Bureau of Standards could determine those areas where there are specific needs for standards. Once a need is determined, the Bureau could either (1) approach the appropriate private standardizing body and recommend that it initiate the development of a standard and volunteer to serve as sponsor, or (2) initiate the development of a standard under the Department's new procedures for the development of Voluntary Product Standards. The latter action could be delayed until either the industry exhibited an unwillingness to develop its own standard or the lack of progress by the industry suggests that the Bureau should move ahead through its own procedures.

The advantages of the above actions would include the development of timely Social Need Standards. A disadvantage which might be encountered in initiating a standard under the VPS procedures could be a negative attitude on the part of industry in responding to a Government-initiated action.

There are a number of questions that can be asked about the procedures used to process the voluntary product standards as there can about those used by the private standardizing bodies: Are the VPS procedures adequate? If not, how can they be changed? Do they provide for effective consumer representation? Do they protect the public interest? If they are slow, how can they be speeded up? Do they adequately provide for the revision or withdrawal of old standards?

A number of contentions have been raised which concern the extent to which parties affected by standardization activities are represented in the process. The existing private standardization bodies have had considerable difficulty in providing appropriate and adequate representation of the "consumer interest" in the development of those few standards which have concerned consumer products. Additionally, there have been problems in obtaining the balance of representation on committees, as required by the specific procedures of individual private standardization bodies. For example, the American Society for Testing and Materials reports in its recent "Yearbook" that balanced representation has not been achieved on a few committees but that continuing attempts are being made to comply with their procedural requirement. The VPS program does not have this problem because there are no numerical requirements placed on the numbers of producers, distributors, and consumers involved. Should the user and consumer segment appointed by OESS to Standards Review and Standing Committees, as normal procedures, contain private citizens, men and women, who are not employed by any segment of the industry interested in the standard? Should the Bureau build up and maintain an official list of such persons that would also be available to the private system and would it be possible for the Bureau to finance their activities? This scheme may be feasible and could provide real protection for the public interest.

The fact that numerous statements have been made concerning the slowness of the voluntary process, in general, in developing standards suggests that the time factor is indeed an issue. It is a tragedy when a slow standards process is concurrent with a significant number of injuries and deaths caused by an unsafe or defective product produced under an inadequate standard. It is also possible that the private standards process is deliberately slow in developing Type IV standards because of the economic losses to be encountered by certain industrial companies or because of the burdensome regulations which will result from their implementation. Are the VPS procedures so fair to all parties that the producer and distributor segments

can take this kind of advantage? Would strict time limits on each step of the procedures eliminate this possibility and speed the process?

8.7 Recommendations

The VPS program should be continued as a supplement to the private standards organizations initiating and processing standards that are needed, but are not being developed by the private organizations. If the private system responds to these needs, then the need for the VPS program should decline. If the private system fails to respond, the VPS program could be strengthened to meet the deficiency. The acceptance of proposals for VPS should be subject to a set of guidelines that will facilitate the timely establishment of requirements for products that have hazards associated with them as well as other social needs of the general public. To process these standards every attempt should be made to obtain suitable representatives of the private consumer and if necessary to finance their expenses. As much as possible the VPS program should concentrate on those standards that contain performance requirements.

When completed, these standards should be submitted to ANSI for approval as American National Standards to strengthen the national system.* To serve as a model, every effort should be made by OESS to continue their review of Voluntary Product Standards, especially with respect to the changing requirements of the program and to make the process responsive and timely by minimizing the possibilities of foot-dragging and other subverting tactics. The VPS program should, of course, continue to avoid the duplication of efforts in the private sector. OESS should continue to use the reference library that it has built up to evaluate the availability of standards. This activity would be essential to the operation of the VPS program and other standardization activities of NBS.

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* See comments by Panel members on page 172.

Listing of Recommendations

The Panel has made a number of recommendations, some of which are interwoven into the text without specific identification as recommendations. For this reason, the recommendations made by the Panel are listed below. The page references in brackets [] refer to the page on which the recommendation is made. Page references in parentheses () refer to parts of the report dealing with the subject or with topics related to the recommendation.

Recommendations on NBS Role in the Engineering Standardization System (See Section 4.2 for Issues.)

[p. 99] The Panel reiterates that clarification of issues requires a clarification of objectives. (pp. 70,71)

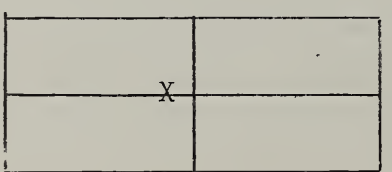
The Panel feels that the Bureau must be much more explicit in its objectives towards engineering standardization than it has been. (pp. 70, 96)

There is no unanimity within the Panel as to its "druthers"--far from it. There is great variation, in fact, covering the extremes, and even a consensus position is difficult to describe. However, the Panel's position might be stated as follows: The emphasis to be placed on the three major roles (see Section 5.7.1 for summary of roles) would be: Heavy on Effectiveness of Standards System, i.e., the Bureau should take an active policy role in the voluntary standardization system (see Section 5.5.3 and 5.4); Heavy on the Support of the Standardization System (see Section 5.6); and Light (but not zero) on the Advocacy of Social Need Standards (i.e., safety, health, consumer interest standards, etc., see Section 5.5).

[p. 100] The active policy role in the system should be with the private system with government technical and possible financial support, but without imposing direct control. (p. 83)

The Panel has no specific recommendations on the manner in which this role might be implemented. There are members on the Panel who feel that a quasi-public National Standards Organization will be needed in the future and therefore the Bureau should opt for more government control, directed towards a quasi-public standards organization with which the Bureau would work very closely. (p. 85)

The Heavy on the Support with some emphasis on Advocacy for Social Need Standards position of the Panel is indicated on the following diagram (p. 98, 99)



[p. 100 cont.] This indicates that research and other support to the standardization system and technical committee participation should be equally emphasized, more emphasis on Social Need Standards than has been the case in the past. (pp. 93, 94)

Since the system policy role mainly concerns top DOC and NBS officials, the sense of the recommendation of this Panel is that the Bureau's objective be: active policy role in the private system, principally in ANSI, promoting an effective private voluntary system while its activities would be directed towards the support of the standardization system with greater emphasis on supporting the development of Social Need standards. The Panel is not recommending the kinds of support activities the Bureau might pursue, their priorities, or intensities. (Chapter 5 for general discussion).

Recommendations on NBS Managerial Activities and Organizations (See Section 4.3 for issues.)

[p. 122] There should be an office within NBS whose concern is the Bureau's total involvement in engineering standards activities. (pp. 102, 104, 106, 107, 108)

[p. 123] The Director should appoint an Engineering Standards Council, to be concerned about establishing priorities for the Bureau's involvement in voluntary standards activities. (pp. 104, 109, 127)

The Council should undertake a study of the relevance to the NBS mission of current standardization committee participation by NBS personnel and their relevance to the current national needs and priorities. (p. 104)

[p. 124] The Director should appoint a Program Manager to be the Bureau's representative to the standards community. (p. 127)

See pages 126-128 for suggested functions and responsibilities for various Bureau organizational units and positions.

[p. 128] There should be a central registry of and a central approval mechanism for some specific types of the Bureau's engineering standards activities. (pp. 102, 105, 106, 107, 108)

The current form NBS-83 "Committee Assignment Record" should be completely revised. (p. 107)

A reporting system for engineering standardization activities should be developed. (pp. 107, 109, 115)

[p. 129] NBS should publish a regular document of significant engineering standards accomplishments and a log of standards in process. (pp. 103, 111)

Develop a system for capturing costs involved in engineering standards activities. (pp. 103, 109, 112, 113)

Establish a policy that would permit NBS to reimburse their staff for required personal memberships in standards organizations when the work is official business of NBS. (pp. 106, 114)

Carefully protect the "third-party" role on engineering standards committees that NBS participants have maintained, in the public interest. (p. 107)

Take steps to more adequately reward standards work of note. (pp. 103, 118)

Develop explicit policy statements for the guidance of NBS staff who participate in engineering standards activities. (pp. 102, 104, 105, 106, 114)

Expand the collection of data about the "standards system." (pp. 105, 163)

Develop a training program for participants in the "system." (pp. 103, 118)

Encourage the involvement of "nonprofessional" personnel in engineering standards activities. (pp. 103, 121)

Recommendations on International Standards Activities (See Section 4.2.5 for Issues)

[p. 154] While the general rationale for international standards may be for harmony, the specific reason for which a nation's delegation participates or should participate is to advance or protect the interests of its country. (pp. 130, 134, 135, 139, 147, 148)

NBS participation should be encouraged in those areas where the United States at large has an interest and where no one else is likely to assert a U.S. position. (pp. 154, 140)

[p. 155] NBS should be willing to cooperate with professional societies and other government agencies in representing U.S. interests. More rigorous consideration should be given to NBS participation at a particular meeting in behalf of a company, industry, or trade association. All such participation should be predicated on some reasonable trade interests of the United States.

[p. 155] Special consideration ought to be given to NBS participation on those committees which are more concerned with scientific standards or the transfer of technology. Thus, NBS participation on committees concerned with Acoustics (IEC/TC 29 and ISO/TC 43), Vacuum Technology (ISO/TC 112), etc., ought to be considered on the basis of different criteria than the possible impact on U.S. exports. (pp. 134, 141, 155)

The Department of Commerce should take the lead in developing a series of pilot studies involving NBS personnel, Department of Commerce economists, industrial representatives, and ANSI officials to establish the feasibility of collecting sound information which would point definitely toward or away from international involvement in specific industrial standardization areas. (pp. 147, 148, 150, 155)

Recommendations on Voluntary Product Standards Program

[p. 167] The VPS program should be continued as a supplement to the private standards organizations, initiating and processing standards that are needed, but are not being developed by the private organizations. (pp. 131, 164). If the private system responds to these needs, then the need for the VPS program should decline. If the private system fails to respond, the VPS program could be strengthened to meet the deficiency. The acceptance of proposals for VPS should be subject to a set of guidelines that will facilitate the timely establishment of requirements for products that have hazards associated with them as well as other social needs of the general public. To process these standards every attempt should be made to obtain suitable representatives of the private consumer and if necessary to finance their expenses. (p. 166). As much as possible the VPS program should concentrate on those standards that contain performance requirements. (p. 165)

When completed, these standards should be submitted to ANSI for approval as American National Standards to strengthen the national system. (p. 87). To serve as a model, every effort should be made by OESS to continue their review of Voluntary Product Standards, especially with respect to the changing requirements of the program and to make the process responsive and timely by minimizing the possibilities of foot-dragging and other subverting tactics. (pp. 162, 164). The VPS program should, of course, continue to avoid the duplication of efforts in the private sector. OESS should continue to use the reference library that it has built up to evaluate the availability of standards. This activity would be essential to the operation of the VPS program and other standardization activities of NBS. (pp. 163, 164).

Charles H. Boehne and Donald R. Mackay request that the following comments be inserted in the report:

We take issue with the recommendation made in this Chapter that "when completed, these standards (i.e. standards developed through the VPS procedures) should be submitted to ANSI to strengthen the national system". This recommendation may lead one to think that this is an obvious step that can be accomplished by a simple administrative process. As a matter of fact this subject is rather like an iceberg - "there's more unseen than seen". There is no question that serious consideration should be given to the suggestion of submitting these new standards to ANSI - however, before that is done, the following, not insignificant, points should be discussed and resolved:

1. The procedures used by the VPS system are considerably more stringent that those used by ANSI -
   - -Will ANSI revise their procedures (else why should we "downgrade ours?) including but not limited to the use of the term "consensus"?
   - -Will they accept, without revision or significant review, the standards submitted to them by VPS?
   - -What would happen if ANSI failed to accept one of our standards?
2. Who will sell the document (the sale price of a VPS is a fraction of what an AMSI standard is sold for? Which is in the best interest to the public?)
3. There is a problem of format - Will the VPS be required to change its format to conform to ANSI's? - a very considerable change.

Appendix A

Speakers

Members of the Standards Policy Panel met with people involved in Standards work in government, industry, and standards organizations, to get their viewpoints and discuss various aspects of standards work. A list of these speakers and their affiliations are as follows:

March 25, 1970, Mr. Richard Simpson, Deputy Assistant Secretary for Product Standards, Department of Commerce

Mr. M. W. Jensen, Acting Director, Institute for Applied Technology, National Bureau of Standards

Dr. A. Allan Bates, Chief, Office of Engineering Standards Liaison, Office of the Director, National Bureau of Standards (retired 6/30/70)

March 27, 1970, Dr. Allen V. Astin, former Director, National Bureau of Standards

April 1, 1970, Dr. E. Horowitz, Assistant Director, Institute for Materials Research, National Bureau of Standards

April 3, 1970, Dr. Ernest Ambler, Director, Institute for Basic Research, National Bureau of Standards

April 7, 1970, Mr. John J. Riordan, Director of Technical Data, Standardization Policy and Quality Assurance, Office of the Assistant Secretary of Defense, (I&L)AR, Department of Defense

Captain J. Patrick Carr, USNR, Staff Director for Plans and Programs of the Technical Data, Standardization, and Quality Assurance Directorate, OASD (I&L), Department of Defense

Lt. Col. Leonard A. Staszak, USAF, Staff Director for the Standardization and Specification Management Division of the Technical Data, Standardization, and Quality Assurance Directorate, Department of Defense

April 8, 1970, Dr. Francis L. LaQue, President, American National Standards Institute, Inc., also Vice President, The International Nickel Company, Inc., New York

April 10, 1970, Dr. Carl Clark, Chairman, President's Commission on Product Safety

April 13, 1970, Mr. Robert B. Ellert, Assistant General Counsel for Science and Technology, Department of Commerce

April 13, 1970, Mr. Gregg Potvin, formerly General Counsel to the Select Committee on Small Business, House of Representatives, Ninetieth Congress, Second Session

April 15, 1970, Mr. M. W. Jensen, Acting Director, Institute for Applied Technology, National Bureau of Standards

April 29, 1970, Mr. Karl S. Geiges, Senior Vice President, Underwriters' Laboratories, Inc.

Mr. David Hoffman, Assistant to the President, Underwriters' Laboratories, Inc.

April 30, 1970,	Mr. William H. Rockwell, Director of Certification and Consumer Standards, American National Standards Institute, Inc.
May 1, 1970,	Mr. Morris Kaplan, Technical Director, Consumers Union
May 5, 1970,	Mr. Norman Pugh, Administrative Assistant, Merchandise Development and Testing Laboratory, Sears Roebuck & Company
	Mr. Howard E. Brehm, Corporate Director of Product Safety, Whirlpoor Corporation
May 8, 1970,	Mr. Roy Trowbridge, Director, Engineering Standards, General Motors Corporation
May 11, 1970,	Dr. Leon Podolsky, Consulting Engineer, Member of Executive Board of U.S. National Committee of the International Electrotechnical Commission
June 10, 1970,	Mr. Ralph L. Harding, Jr., President, Society of the Plastics Industries

Appendix B

Examples of Types of Voluntary Standards

Type 1, Non-product Engineering Standards

Y10.3-1968	ANS Standard, Letter Symbols for Quantities Used in Mechanics of Solids
D 123-69a	ASTM Standard Definitions of Terms Relating to Textile Materials
D 2679-69	ASTM Standard Method of Test for Electrostatic Charge
D 2749-68	ASTM Standard Definitions of Terms Relating to Plastic Pipe Fittings
A 2.0-68	AWS Welding Symbols

Type 2, Industrial Market Product Standards

B 18.2.1-1965	ANS Standard, Square and Hex Bolts and Screws
B 27.4-1967	ANS Standard, Beveled Washers
B 94.11-1967	ANS Standard, Twist Drills-Straight Shank and Taper Shank Combined Drills and Countersinks
D 396-69	ASTM Standard Specifications for Fuel Oils
D 2474-69	ASTM Standard Specification for Vinyl Chloride Copolymer Resins

Type 3, Retail Market Product Standards

Z 21.1.1-1967	ANS Standard for Domestic Gas Ranges - Free Standing Units
DA-2	AHAM Electrically Heated Bed Coverings Standard
DA-3	AHAM Electric Waffle Baker and Sandwich Griss Standard
UL 507-1969	UL Electric Fans
UL 560-1968	UL Electric Home-laundry Equipment

Type 4, Obligatory Standards (Relating to Public Health, Safety, and Welfare)

A 40.8-1955	ANS National Plumbing Code
C 95.1-1966	ANS Standard, Safety Level of Electromagnetic Radiation with Respect to Personnel
NFPA 54A-1969	NFPA Industrial Gas Piping and Equipment
NFPA 58-1969	NFPA Storage and Handling Liquefied Petroleum Gases
NFPA 70-1968	NFPA National Electrical Code (ANS C 1-1968)
ANSI C-12-1970	Code for Electricity Metering (5th Edition)

Appendix C

Report on the Panel's Survey of NBS Participants on Standardization Committees

The general purpose of the survey was to assemble quantitative and qualitative information about the activities of NBS staff members who serve on voluntary standardization committees.

For many reasons, the survey results are not easily interpreted. This report is meant to summarize some of the more important cautions.

Contents

1. Distribution of the questionnaires; response rate. The questionnaire (Exhibit A) was addressed to committee participants and one completed questionnaire was requested for each committee membership.

The "mailing list" was based on a mid-March 1970 listing made from the OESL punched card file. Panel members deleted from this list those lines that obviously did not pertain to standardization committees (journal editorships, etc.). A copy of the OESL listing item (or items) was sent with the questionnaire(s) to the potential respondent. The cover letter on the questionnaire offered additional questionnaires.

Some of the questionnaires were delivered by hand by Panel members. Some were distributed through Division offices. Some were mailed directly to potential respondents. One Division Chief asked Dr. Suzuki to appear at a staff meeting to explain the survey. The methods of distribution were chosen, according to the Panel members' judgment, to obtain the best possible combination of speed of delivery and encouragement of cooperative response.

Because of many differences between current committee memberships and items in the OESL list, the response rate was tabulated in terms of numbers of persons. The table below shows by Institute/Center the number of persons who were sent questionnaires and the number of persons who returned at least one.

A handful of returns was received from persons (including one Panel member) not on the "mailing list." Some responses were marked "this is not a standards committee" or equivalently, and were not included in further tabulations. Presumably, some felt the questionnaire was not applicable to themselves and simply discarded it. Doubtless, there were some committee members who never received questionnaires.

The response rates shown in the table reflect the results of vigorous telephone follow-up in IAT by the IAT Executive Officer's office. The staff meeting of the Office of Information Processing Standards may have contributed to the high response rate in CCST.

For reasons sketched above, it is not possible to define 100% coverage of the intended respondents, and the recorded response rate cannot be interpreted as an indication of the fraction of NBS standardization committee activity covered.

Number of persons:

Institute/ Center*	To Whom questionnaires were sent	From whom at least one reply was received	Percent
Dir. Office	14	11	78
IBS	112	86	77
IMR	77	55	71
IAT	121	120	99
CRR	12	9	75
CCST	25	23	92
Total	361	304	84

*Director's Office includes Associate Director for Information Programs. The abbreviations to be employed throughout the Appendix are:

IBS - Institute for Basic Standards
IMR - Institute for Materials Research
IAT - Institute for Applied Technology
CRR - Center for Radiation Research
CCST- Center for Computer Sciences and Technology

No attempt has been made to reconcile the table showing response rate with Table 0.1 (below) showing the total number of respondents by major analytic categories. In particular, most persons shown holding membership in an international standards or "standards policy" committee are also members of national standards committees.

The Panel believes that the "missing" data pertain to an insignificant part of the NBS standardization committee activity.

Some confirmation was obtained by comparison with data obtained in reply to Dr. Kushner's memorandum (Exhibit B). The data are given and discussed in Chapter 3.

The questionnaires were distributed on (or shortly after) March 30, 1970. Reply before April 6 was requested. Most returns had been received by April 10; those from Boulder arrived about 10 days later, and there were stragglers until the end of April.

2. Coding the submitted questionnaires. Members of a subcommittee of the Panel carried out the following steps in the preliminary processing of all questionnaires received:

a. Check-off against the "mailing list." Since the OESL abbreviations did not always match the committee names on the forms, this was not a clerical task.

b. Sorting by Institute/Center and within each into one of three categories: domestic standards writing, international standards writing, or "standards policy." Because of a defect in the questionnaire (discussed below) this task required technical and personal information. Also at this stage, the Panel members set aside some questionnaires that were judged not to be reports of voluntary standardization committees. Some informal conferences were held on borderline cases, but the sorting was chiefly done by unreviewed individual decisions.

c. Each questionnaire was read by one member of the Panel's subcommittee, who saw to it that the correct number of answers was supplied for each question. There were some written and mutually agreed rules for interpreting frequent types of marginal comments. The answer "NA" was supplied for unanswered questions and in cases where marginal comments could not be classified. The response "Not applicable" was also coded "NA", and appears under "No Answer" in the summary tables.

The principal problem in coding the questionnaires arose from the incompleteness of Question 2: "Is this committee's primary concern standards policy?... If the answer is yes, select only the applicable following questions." The respondent was assumed to be a standardization committee participant and was expected to understand the implicit alternative: "If the answer is no, answer all the questions." It turned out that the alternative understood was: "If the answer is no, you need not complete the questionnaire." The questionnaire writers goofed by failing to spell out the intended alternative.

In view of the defect in the questionnaire, the results give excellent evidence of the cooperative spirit of the NBS staff. However they chose to answer Question 2 (and there were many marginal complaints), almost all went on to complete most of the questionnaire.

But the Panel's intention to prepare separate tables for technical standards writing committees on the one hand and "standards policy" committees (ANSI Boards of Standards Review, etc.) on the other hand, ran into difficulties. The classification was made by Panel members on the basis of personal knowledge and evidence supplied in the questionnaires, but the interpretations were individual and might be arguable.

The defect on Question 2 may also explain to some extent the relatively high frequency of "NA" responses to Questions 22-26, for which the respondent probably had to refer to files, and might have felt free to omit.

Some coding problems arose in connection with the travel cost data (Question 20). Provision had been made for splitting the cost of dual-purpose trips when the second purpose of the trip was attendance at scientific meetings, but no provision was made for distributing the cost of a trip whose purpose was participation in meetings of two or more standardization committees. The Panel member who coded the questionnaires had to judge whether or not the distribution of costs had been made by the respondent.

Another source of difficulty in interpreting travel cost data may be mentioned here. The questionnaire did not ask for the source of travel funds. Respondents may or may not have reported costs paid by OESL or by other agencies, and especially may not have reported standards committee travel costs reimbursed by private standards bodies (as is customary for certain ASHRAE committees). A number of respondents wrote marginal notes about personal expenditures for travel to committee meetings, both domestic and international.

The separation of domestic and international standards committees was another source of possible errors in coding. The response to Question 1 was sometimes "ANSI" in the case of an ANSI "Technical Committee for ISO TC___." In most such cases, the questionnaire was assigned to the international category.

Sorting out questionnaires reporting "standards policy" committees was felt to be necessary because many of the questions were applicable (if at all) only with quite different meanings in the case of the high-level review committees such as ANSI Standards Boards (recently renamed Board of Standards Review). Similar differences of meaning occur in the case of international standardization committees.

Generally speaking, the Panel accepted the respondent's definition of "a committee membership." Thus, we accepted the respondent's decision about the number of questionnaires to submit covering memberships in a parent committee and one or more of its subcommittees. There were quite a few cases where one committee is jointly sponsored by or has liaison representatives from several standardization organizations. In these cases also, the respondent decided how many questionnaires should be submitted.

Most of the other coding problems were routine in nature.

3. Tabulation plans. Several kinds of basic units were in principle available: persons, committee memberships (i.e., questionnaires); either of the foregoing in cost units rather than simply enumerated.

Tables concerning individual data (age, grade) and cost (days, travel cost) were compiled.

Other tables were made in terms of "number of committee memberships." This choice was made principally in order that rapid hand tabulation could be accomplished. Creation of tables in cost units would have required a substantially larger effort and was judged to be beyond the time and staff resources of the Panel.

The basic tally sheets were made by Division (or Office) for the Institutes. Centers were not subdivided. Some divisions that are not very active in standardization work were grouped together for tabulation (e.g., the IBS Institute Office was combined with the Applied Mathematics, Heat, and Atomic and Molecular Physics Divisions). Only one respondent identified himself with the newly created Optical Physics Division; hence the Metrology Division appears in the Panel's tables.

The basic tabulation was made on April 17. This work, approximately 50 clerical man-hours, was organized and supervised by C. H. Boehne.

Tally sheet totals (for the tables presented in this Appendix), summary tables for the Panel report, and tabulation of Boulder and other late returns were done by the Statistical Engineering Laboratory.

The tabulation operations were not exhaustively checked. Accordingly, some minor discrepancies appear among the totals when tables are compared. None of these discrepancies is serious.

The Appendix tables are numbered in three series:

A - Domestic standardization committees,

B. International standardization committees,

C - "Standards policy" committees.

Some questions were tabulated only for series A tables.

The list below is a key to all the Appendix tables which are labeled by Division number.

IBS Divisions

200 - Institute Office, Applied Mathematics, Heat, Atomic and Molecular Physics

211 - Electricity

212 - Metrology (now Optical Physics, in combination with Atomic and Molecular Physics)

213 - Mechanics

271 - Radio Standards Physics (now Quantum Electronics), Time and Frequency, Cryogenics

272 - Radio Standards Engineering (now Electromagnetics)

IMR Divisions

300 - Institute Office, Office of Standard Reference Materials

310 - Analytical Chemistry

311 - Polymers

312 - Metallurgy

313 - Inorganic Materials

316 - Physical Chemistry

IAT Divisions

400 - Institute Office (including 3 Offices)

404 - Office of Weights and Measures, Office of Vehicle Systems Research, Technical Analysis, Instrument Shops, Measurement Engineering

411 - Product Evaluation

421 - Building Research

425 - Electronic Technology

4. Tables. The tables are presented in a standard form in most cases, with the questionnaire item reproduced for each question. They are numbered to correspond to the question numbers, with "zero" given as the number of introductory tables.

No.	Title or Description
0.1	Number of survey respondents and number of committees reported
0.2	Distribution of survey respondents by age and Civil Service grade
0.3	Number of years on the committee
1.	Organization (ANSI, ASTM, etc.)
2.	(Not Tabulated)
3.	Type of standard (series A, only)
4.	Principal beneficiary
5.	Primary motivation to serve on committee
6.	Whom do you represent?
7.	Status on committee
11.	Frequency of committee meetings
12.	Frequency of committee business by correspondence
14.	Travel ceiling and other limitations.
16	Availability or training of replacement
17.	Primary input to committee (series A, only)
21.	Rewards for participation

Exhibit A of Appendix C

U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards
Washington, D.C. 20234

Date: March 30, 1970

ply to
ttn of:

ubject: Participation in Voluntary Standardization Committees

To:

Many of us spend a significant part of our time participating in non-government voluntary standardization activities through committee work. A recent NBS survey found that well over $1.4 million is annually expended in this activity by our staff. Although attempts have been made in the past to evaluate our participation, they have not been sufficiently thorough. Dr. Branscomb recently established a study group with representatives from Institutes and Centers to look at this area and provide him with guidance on the what, why, when and how of our participation. To do this, the study group needs the cooperation of those of you who are on the firing line.

Attached is a questionnaire that, when completed and returned by you, will greatly assist the study group in its task. The completion of a questionnaire for each of your standardization assignments is needed. Please follow directions on the questionnaire, but add comments if the multiple choice is too constraining.

Would you please complete this form as quickly and accurately as you can and return it to Mr. C. H. Boehne, Room B120, Technology Building, by April 6, 1970. If additional questionnaires are needed, telephone Mr. Boehne, Ext. 3324.

Chairman,
NBS Standards Policy Issue Study

Return to
C. H. Boehne
B120 TECH

Voluntary Non-Government Standardization Activities
Questionnaire

Name _____ Div. & Sec. _____ GS-Grade _____ Age _____ Yrs. at NBS _____

* Committee Name and No. _____ Yrs. on the Committee _____

1. Organization:

   (a) ANSI /__/ (d) ISO /__/

   (b) ASTM /__/ (e) IEC /__/

   (c) IEEE /__/ (f) OTHER (Specify) _____

2. Is this committee's primary concern standards policy?

   /__/ Yes /__/ No

   If the answer is yes, select only the applicable following questions.

3. Which type of standard is the committee concerned with?

   (a) Engineering Design /__/

   (b) Specification (material, system, etc.) /__/

   (c) Dimensional /__/

   (d) Test method /__/ Check no more than two

   (e) Standard practice /__/

   (f) Nomenclature, units, symbols /__/

   (g) Performance /__/

   (h) OTHER (Specify) _____

* Includes committee, subcommittee, working group, task force, etc.

4. Who is the primary beneficiary of the standard?

(a) Household consumer /__/

(b) Industrial consumer /__/

(c) Producer /__/

(d) Scientific & Engineering Community /__/ Check only one

(e) Government (local, state, federal) /__/

(f) OTHER (Specify) _____

5. What is your primary motivation to serve on the committee?

(a) professional development /__/

(b) carrying out a role that management feels is important /__/

(c) personal interest /__/ Check only one

(d) to provide an unbiased opinion or technical assistance /__/

(e) guidance of NBS R & D programs /__/

(f) OTHER (Specify) _____

6. Who do you represent on the committee?

(a) yourself /__/

(b) NBS /__/

(c) Commerce Department /__/

(d) U.S. Government /__/ Check only one

(e) a professional society /__/

(f) OTHER (Specify) _____

7. Your status on the committee is

   (a) non-voting member /__/

   (b) observer /__/

   (c) voting member /__/

   (d) officer /__/

   (e) technical advisor /__/

   (f) OTHER (Specify) _____

8. What is the size, in number of members, of this committee?

   _____

9. How many members represent each of these three types of interest?

   Producer _____

   Consumer _____

   General Interest _____

10. Is this distribution in the best national interest?

    Yes /__/ No /__/ Don't know /__/

11. How often has the committee met in the past two years?

    (a) about once a year /__/

    (b) about twice a year /__/

    (c) three or more times a year /__/

    (d) none /__/

12. How often has the committee conducted business by correspondence in place of or in addition to meetings during the past two years?

    (a) about once a year /__/

    (b) about twice a year /__/

    (c) three or more times a year /__/

    (d) none /__/

13. Have you been an active participant?

Yes /__/ No /__/

14. Has your participation been limited or restricted in one way or another?

Yes /__/ No /__/

IF YES: Travel ceiling /__/, Policy /__/, OTHER (Specify) _____.

15. How do you see the level of activity of the committee over the next two years?

(a) increasing /__/

(b) decreasing /__/ Check only one

(c) remaining constant /__/

16. Are there others within NBS that are being groomed to take over this committee activity or who could take over now?

/__/ Yes /__/ No

17. How would you describe your primary input to the committee?

(a) Technical advice /__/

(b) supporting R & D (lab work) /__/

(c) administrative /__/ Check only one

(d) financial /__/

(e) NBS seal of approval /__/

(f) OTHER (Specify) _____

18. How were you selected for this committee?

(a) my boss submitted my name /__/

(b) through a professional contact /__/

(c) I thought it was important and sought it /__/ Check only one

(d) Legacy from NBS employee /__/

(e) through identification in other committee activity /__/

(f) OTHER (Specify) _____

19. How many days in FY 1969 did you spend on the work of this committee?

_____

20. How many dollars did you spend for travel related to the work of this committee in FY 1969? _____
(Count ½ of the cost if travel included a professional meeting.)

21. How has your participation in this committee been rewarded?

(a) significant factor in promotion /__/
(b) increased prestige at NBS /__/
(c) increased prestige in professional community /__/
(d) no apparent reward /__/
(e) OTHER (Specify) _____

22. List the date of issuance and title of the most recent standard produced by this committee.

23. What was the responsibility of this committee in producing the above standard?

(a) writing it /__/
(b) giving final technical approval /__/
(c) administrative procedure only /__/
(d) OTHER (Specify) _____

24. What is the approximate date when work was started on the standard?

25. Who or what instigated initiation of the work?

26. Will this standard or any other output of this committee possibly be incorporated in legislation at the federal, state, or local level?

Yes /__/ No /__/

IF YOU ARE FILLING OUT MORE THAN ONE FORM COMPLETE QUESTION NO. 27 ON ONLY ONE FORM.

27. It is difficult to assess the benefit, significance, or relevance of NBS participation in voluntary non-government standardization activities. In an attempt to obtain miscellaneous information that may be useful for such an assessment, we have devised the following questions. Your answering of these questions is optional.

(a) Can you give an example of an NBS contribution that prevented a serious error or blunder?

(b) Are there any less obvious byproducts of NBS participation in standardization work?

(c) Can you give us any outstanding success (or failure) stories involving your committee activity?

(d) What is your evaluation of the significance and relevance of your committee and your activity on it? Is it worth the effort and expense?

Table 0.1 Number of Survey Respondents and Number of Committees Reported

Series A. Domestic

	Respon-dents[a]	Commit-tees	Prof. Staff[b]
Dir. Office	10	12	36[c]
200	7	14	91
211	12	39	41
212	12	66	114[d]
213	18	50	62
271	11	15	133
272	22	41	77
IBS total	82	225	518
300	5	6	17
310	16	35	71
311	3	16	55
312	14	40	57
313	13	20	69
316	7	12	59
IMR total	58	129	328
400	9	34	) 133
404	19	36	
411	10	31	24
421	43	118	80
425	28	60	47
IAT total	109	279	284
CRR	7	14	81
CCST	17	35	89
NBS total	283	694	1336

[a] After removal of questionnaires reporting nonstandardization committees.

[b] 27 June 1970, Full-time permanent professional staff.

[c] Offices of Director and of Associate Director for Information Programs

[d] Including all of Optical Physics

Table 0.1 (Cont.)

Series B. International

	Respondents	Committees
Dir. office	0	0
IBS	10	24
IMR	9	9
IAT	17	27
CRR	4	4
CCST	3	3
NBS total	43	67

Series C. Standards Policy

	Respondents	Committees
Dir. office	2	12
IBS	10	16
IMR	6	7
IAT	15	24
CRR	3	3
CCST	7	8
NBS total	43	70

Table 0.2 Distribution of Survey Respondents by Age and Civil Service Grade

GS Grade	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	Total
				Series A. Domestic						
9-11	2	2	2	2	3	1	-	-	-	12
12	2	7	5	5	6	4	3	1	2	35
13	2	4	7	13	12	14	4	4	2	62
14	-	5	10	16	12	15	13	4	2	77
15	-	-	10	8	15	18	9	4	5	69
16-17	-	-	1	5	4	2	9	-	2	23
Total	6	18	35	49	52	54	38	13	13	278
				Series B. International						
7-11	1			1						2
12		1				2				3
13	1			1	1	2				5
14				1	2	2			1	6
15			4	1	5	7	2	2	1	22
16 & above							5	1		6
Total	2	1	4	4	8	13	7	3	2	44
				Series C. Standards Policy						
13			1		1		1			3
14						4	3	1		8
15			3	2	4	4	3		1	17
16 & above				2	4	5	3		1	15
Total			4	4	9	13	10	1	2	43

Table 0.3 Number of Years on the Committee

Name _____ Div. & Sec. _____ GS-Grade _____ Age _____ Yrs. at NBS _____

* Committee Name and No. _____ TABLE 0.3 Yrs. on the Committee

Series A. Domestic

	1 or less	2	3	4	5	6-10	11 or more	NA		Total
Dir. Office	6	1	1	1	0	2	1	0		12
200	3		1	1	1	5	2	1		14
211	3	3	3	3	3	17	5	2		39
212	3	6	4	6	3	24	16	3		65
213	4	4	7	1	7	13	8	5		49
271	5	2	1	1	2	3	1			15
272	4	5	4	5	4	14	5	1		42
IBS total	22	20	20	17	20	76	37	12		224
300	1	1			2		2			6
310	4	5	3		1	7	15			35
311	1	9				6				16
312	1	6	4	4	3	16	7			41
313	5	4	2	5		4	1	2		23
316	2	1	1			3	5			12
IMR total	14	26	10	9	6	36	30	2		133
400	5	1	2	3	4	10	11			36
404	10	12	10	1	1	2		1		37
411	7	1	0	2	1	11	9			31
421	23	17	17	10	13	28	9			117
425	18	8	5	4	6	8	10			59
IAT total	63	39	34	20	25	59	39	1		280
CRR	1	7	2	1	0	2	1	0		14
CCST	16	6	4	2	3	3	0	0		34
NBS total	122	99	71	50	54	178	108	15		697

Table 0.3 Cont.

Series B. International

	1 or less	2	3	4	5	6-10	11 or more	NA		Total
Dir. office										0
IBS	5	9	1			6	2			23
IMR	3			2	3	2				10
IAT	3	10	3	4	3	4	1			28
CRR		2				2				4
CCST	1	1	1							3
NBS total	12	22	5	6	6	14	3	0		68

Series C. Standards Policy

Dir. office	5	2	1			1	3			12
IBS		4	2	2	1	6		1		16
IMR	2		2	2		1				7
IAT	8	5	5	3	1	2	1			25
CRR	1	1		1						3
CCST	2	5	1							8
NBS total	18	17	11	8	2	10	4	1		71

Table 1. Organization (ANSI, ASTM, etc.)

1. Organization:

(a) ANSI ☐ (d) ISO ☐

(b) ASTM ☐ (e) IEC ☐

(c) IEEE ☐ (f) OTHER (Specify) _____

Series A. Domestic

	ANSI	ASTM	IEEE	Other	NA	Total
Dir. Office	7	3	0	2		12
200	2	7		5		14
211	22		13	3		38
212	55	4		6		65
213	22	16		11		49
271		5	2	8		15
272	5	3	31	2		41
IBS total	106	35	46	35		222
300		4		2		6
310	1	30		4		35
311	3	13				16
312		30	1	10		41
313	6	15		2		23
316	2	10				12
IMR total	12	102	1	18		133
400	8	12		16		36
404	8	2	1	26		37
411	6	19		8		33
421	36	50		31		117
425	8	20	11	21		60
IAT total	66	103	12	102		283
CRR	11	2	0	1		14
CCST	29	1	0	4		34
NBS total	231	246	59	162	0	698

Table 1. Continued

Series B. International

	ISO	IEC	Other	NA	Total
Dir. office					0
IBS	5	14	5		24
IMR	3	2	5		10
IAT	11	12	5		28
CRR	2	2			4
CCST	2	1			3
NBS total	23	31	15	0	69

Series C. Standards Policy

	ANSI	ASTM	IEEE	ISO	IEC	Other	NA	Total
Dir. office	4	3			1	4		12
IBS	7	1	5			3		16
IMR		3				4		7
IAT	8	5		5	6	1		25
CRR	2					1		3
CCST	6					2		8
NBS total	27	12	5	5	7	15		71

Table 3. Type of Standard (Series A only)

3. Which type of standard is the committee concerned with?

(a) Engineering Design ☐

(b) Specification (material, system, etc.) ☐

(c) Dimensional ☐

(d) Test method ☐

(e) Standard practice ☐

(f) Nomenclature, units, symbols ☐

(g) Performance ☐

(h) OTHER (Specify) _____

Check no more than two *

Series A. Domestic

	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	NA	Total
Dir. Office	3	1	0	3	8	2	1	6	0	24
200		3	1	5	4	9	2		4	28
211		5		24	8	20	8	7	6	78
212	21	6	22	20	15	7	2	3	34	130
213	6	12		24	38	5	2	1	10	98
271	2	7		5	5	5	1	3	2	30
272		5		25	16	8	6	14	8	82
IBS total	29	38	23	103	86	54	21	28	64	446
300		2		6	1		1	2		12
310		8		34	13	11	2		2	70
311		10	1	14	5	1	1			32
312	4	5		25	25	5	12		6	82
313	1	12		19	5	1	1	7		46
316		2		8	7	3		4		24
IMR total	5	39	1	106	56	21	17	13	8	266
400	3	12		17	17	11	9	3		72
404	5	11	3	21	12	3	15	2	2	74
411		13		22	6	7	6	4	4	62
421	33	39	3	74	43	4	25	5	6	232
425	1	14	3	46	17	23	3	12	1	120
IAT total	42	89	9	180	95	48	58	26	13	560
CRR	0	2	1	3	4	7	4	3	4	28
CCST	0	17	1	4	20	5	7	4	8	66
NBS total	79	184	35	399	269	137	108	82	97	1390

* If only one block was checked, the entry was counted twice.

Table 4. Principal Beneficiary

4. Who is the primary beneficiary of the standard?

(a) Household consumer ☐

(b) Industrial consumer ☐

(c) Producer ☐

(d) Scientific & Engineering Community ☐

(e) Government (local, state, federal) ☐

(f) OTHER (Specify) _____

Check only one

Series A. Domestic

	(a)	(b)	(c)	(d)	(e)	(f)	NA	"All"	Total
Dir. Office	0	2	1	7	0	2	0	0	12
200		3		9		1	1		14
211	2	9		23		1	2		37
212		1	12	31	3	6	7		60
213	4	7		28		4	4	2	49
271		2		10		2	1		15
272		7		27	4	1	2		41
IBS total	6	29	12	128	7	15	17	2	216
300		2		4					6
310	1	11	1	21			1		35
311				16					16
312	2	7		22	4		6		41
313	2	6	1	13	1				23
316	1	4		5			2		12
IMR total	6	30	2	81	5	0	9	0	133
400, 404	15	14	10	11	4	16	2	1	73
411	3	14		6	1	6		1	31
421	17	28	10	32	10	16	2	2	117
425		19	10	25		2	2	2	60
IAT total	35	75	30	74	15	40	6	6	281
CRR	0	5	2	5	0	2	0	0	14
CCST	0	5	1	2	4	23	0	0	35
NBS total	47	146	48	297	31	82	32	8	691

Table 4. Continued

Series B. International

	(a)	(b)	(c)	(d)	(e)	(f)	NA	"All"	Total
Dir. office									0
IBS		5		12		1	3	2	23
IMR		2		4			2		8
IAT	2	7	2	7	1	10			29
CRR				3					4
CCST				2		1			3
NBS total	2	14	2	28	1	13	5	2	67

Series C. Standards Policy

Dir. office	1			1		3	3	4	12
IBS		3		5	1	3	4		16
IMR		1		3			4		8
IAT	4	1	4	5	1	3	4	3	25
CRR						3			3
CCST			1		1	5	1		8
NBS total	5	5	5	14	3	17	16	7	72

Table 5. Primary Motivation to Serve on Committee

5. What is your primary motivation to serve on the committee?

(a) professional development ☐

(b) carrying out a role that management feels is important ☐

(c) personal interest ☐ Check only one

(d) to provide an unbiased opinion or technical assistance ☐

(e) guidance of NBS R & D programs ☐

(f) OTHER (Specify) _____

Series A. Domestic

	(a)	(b)	(c)	(d)	(e)	(f)	NA		Total
Dir. Office	2	9	0	1	0	0	0		12
200	2	1	1	8		2			14
211	1	3	1	30	2	0	2		39
212		1	1	52	5	5	1		65
213	6	5	5	20	7	6			49
271			1	12	1	1			15
272	5	2	1	22	4	6	1		41
IBS total	14	12	10	144	19	20	4		223
300		1		4	1				6
310	2	10		21	2				35
311			2	14					16
312	1	6	5	20	8		1		41
313		6	2	13	2				23
316	2		1	7	2				12
IMR total	5	23	10	79	15	0	1		133
400	2	12	2	15	2	2	1		36
404	1	8	1	14	11	2			37
411	5	7		5	1	13			31
421	7	25	7	55	14	9			117
425	5	11	3	20	16	5			60
IAT total	20	63	13	109	44	31	1		281
CRR	2	3	0	8	0	1	0		14
CCST	0	16	4	7	2	5	0		34
NBS total	43	126	37	348	80	57	6		697

Table 5. Continued

Series B. International

	(a)	(b)	(c)	(d)	(e)	(f)	NA		Total	
Dir. office									0	
IBS		5	3	15		1			24	
IMR	2	3	1	3			1		10	
IAT		12		9		7			28	
CRR		1		2		1			4	
CCST		1		1		1			3	
NBS total	2	22	4	30		10	1		69	

Series C. Standards Policy

Dir. office		11					1		12	
IBS	1	5	1	8			1		16	
IMR	2	1		1		2	1		7	
IAT		14		3	4	4			25	
CRR		1				2			3	
CCST	1	2		1		4			8	
NBS total	4	34	1	13	4	12	3		71	

Table 6. Whom do you represent on the Committee?

(a) yourself ☐

(b) NBS ☐

(c) Commerce Department ☐

(d) U.S. Government ☐ Check only one

(e) a professional society ☐

(f) OTHER (Specify) _____

Series A. Domestic

	(a)	(b)	(c)	(d)	(e)	(f)	NA	Total
Dir. Office	2	7	3	0	0	0	0	12
200	1	8	1		2	1	1	14
211	8	26			2		3	39
212	12	51			1		1	65
213	34	12		2	1			49
271	3	12						15
272	8	30				3	1	42
IBS total	66	139	1	2	6	4	6	224
300		6						6
310	6	29						35
311		14	2					16
312	25	15					1	41
313	3	18			2			23
316	5	4				2	1	12
IMR total	39	86	2	0	2	2	2	133
400	7	22		3	1	2	1	36
404	14	19	2		1	1		37
411	8	11				12		31
421	39	70				6	2	117
425	30	26	1			2	1	60
IAT total	98	148	3	3	2	23	4	281
CRR	1	9	0	0	3	0	1	14
CCST	10	23	1	0	0	0	0	34
NBS total	216	412	10	5	13	29	13	698

Table 6. Continued

Series B. International

	(a)	(b)	(c)	(d)	(e)	(f)	NA		Total
Dir. office									0
IBS	11	3				10			24
IMR	4	2		3	1				10
IAT	4	9				15			28
CRR		2				2			4
CCST	1			1		1			3
NBS total	20	16	0	4	1	28	0		69

Series C. Standards Policy

Dir. office	4	5			2				11
IBS	2	10			2	2			16
IMR	2	2			2		1		7
IAT	5	13	2			5			25
CRR		2				1			3
CCST	3	4	1						8
NBS total	16	36	3	0	6	8	1		70

Table 7. Status on Committee

7. Your status on the committee is

(a) non-voting member ☐

(b) observer ☐

(c) voting member ☐

(d) officer ☐

(e) technical advisor ☐

(f) OTHER (Specify) _____

Series A. Domestic

	(a)	(b)	(c)	(d)	(e)	(f)	NA		Total
Dir. Office	1	1	10	0	0	0	0		12
200	1		5	5	2	1			14
211			28	6	3		2		39
212	1		44	14	2	4			65
213	1		28	9	10	1			49
271	1		9	3	2				15
272			25	11	2	2	1		41
IBS total	4	0	139	48	21	8	3		223
300	1		5						6
310	2	3	25	3	2				35
311			13	3					16
312			34	5		1	1		41
313	1		12	8	2				23
316	3		2	3	1	3			12
IMR total	7	3	91	22	5	4	1		133
400	3		18	7	5	3			36
404		4	27	2	2	2			37
411			21	6	1	3			31
421	7	1	79	24	4	2			117
425	1	6	27	14	10	1	1		60
IAT total	11	11	172	53	22	11	1		281
CRR	1	2	7	3	1	0	0		14
CCST	0	6	21	3	0	4	0		34
NBS total	24	23	439	129	49	27	5		696

Table 7. Continued

Series B. International

	(a)	(b)	(c)	(d)	(e)	(f)	NA		Total
Dir. office									0
IBS	1		11	9	1		1		23
IMR			4	3	1	2			10
IAT			12	5	3	8			28
CRR				1	3				4
CCST			1	1		1			3
NBS total	1	0	28	19	8	11	1		68

Series C. Standards Policy

Dir. office			11	1					12
IBS			11	1	1	1	2		16
IMR			2	2		2	1		7
IAT			19	3		3			25
CRR			2		1				3
CCST	1	1	2	2		2			8
NBS total	1	1	47	9	2	8	3		71

Table 11. Frequency of Committee Meetings

11. How often has the committee met in the past two years?

(a) about once a year ☐

(b) about twice a year ☐

(c) three or more times a year ☐

(d) none ☐

Series A. Domestic

	(a)	(b)	(c)	(d)	NA	Total
Dir. Office	4	3	1	4	0	12
200	4	9		1		14
211	13	14	2	8	2	39
212	22	22	4	16	1	65
213	11	30	1	7		49
271	5	5	4	1		15
272	7	20	3	10	1	41
IBS total	62	106	14	43	4	223
300	1	4		1		6
310	8	22	6			36
311	1	2	13			16
312	10	30			1	41
313	6	8	6	2	1	23
316	7	3	2			12
IMR total	33	69	27	3	2	134
400	13	16	2	4		35
404	7	12	16	1		36
411	5	19	2	2	2	30
421	28	57	15	15	2	117
425	8	15	29	5	2	59
IAT total	61	119	64	27	6	277
CRR	5	5	3	1	0	14
CCST	0	5	30	0	0	35
NBS total	165	301	139	78	12	695

Table 11. Continued

Series B. International

	(a)	(b)	(c)	(d)	NA		Total			
Dir. office							0			
IBS	17	1		5	1		24			
IMR	5	1		4			10			
IAT	14	5	3	6			28			
CRR	2	2					4			
CCST		1	1	1			3			
NBS total	38	10	4	16	1		69			

Series C. Standards Policy

Dir. office	4	4	2	1	1		12			
IBS	5	4	1	4	2		16			
IMR	1	2	3		1		7			
IAT	6	6	9	2	2		25			
CRR	1	2					3			
CCST	2	2	4				8			
NBS total	19	20	19	7	6		71			

Table 12. Frequency of Committee Business by Correspondence

12. How often has the committee conducted business by correspondence in place of or in addition to meetings during the past two years?

(a) about once a year ☐

(b) about twice a year ☐

(c) three or more times a year ☐

(d) none ☐

Series A. Domestic

	(a)	(b)	(c)	(d)	NA		Total			
Dir. Office	2	3	4	3	0		12			
200	2	5	6		1		14			
211	7	7	20	3	2		39			
212	13	14	29	8	1		65			
213	9	19	17	4			49			
271		6	7	2			15			
272	5	14	9	8	5		41			
IBS total	36	65	88	25	9		223			
300		3	2	1			6			
310	1	8	24	1	1		35			
311		1	15				16			
312	11	18	9	2	1		41			
313	3	5	12	2	1		23			
316	3	3	4	2			12			
IMR total	18	38	66	8	3		133			
400	5	10	11	9			35			
404	2	10	22	3			37			
411	4	10	11	4	2		31			
421	18	33	59	6	1		117			
425	7	10	36	4	2		59			
IAT total	36	73	139	26	5		279			
CRR	1	5	8	0	0		14			
CCST	4	6	14	11	0		35			
NBS total	97	190	319	73	17		696			

Table 12. Continued

Series B. International

	(a)	(b)	(c)	(d)	NA		Total
Dir. office							0
IBS	3	7	13		1		24
IMR	1	1	8				10
IAT	2	4	19	3			28
CRR		2	2				4
CCST		1	2				3
NBS total	6	15	44	3	1		69

Series C. Standards Policy

Dir. office	3		7		2		12
IBS	1	4	6	2	3		16
IMR	1	2	2	1	1		7
IAT	3	3	16	1	2		25
CRR		1	2				3
CCST	1	1	4	2			8
NBS total	9	11	37	6	8		71

Table 14. Travel Ceiling and other Limitations

14. Has your participation been limited or restricted in one way or another?

Yes ☐ No ☐

IF YES: Travel ceiling ☐, Policy ☐, OTHER (Specify) _____.

Series A. Domestic

	No	YES		NA	Total
		Travel	Other		
Dir. Office	11		1	0	12
200	6	8			14
211	27	11	1		39
212	39	22	4		65
213	23	17	9		49
271	11	3	1		15
272	5	34	1	1	41
IBS total	111	95	16	1	223
300	6				6
310	28	5	1	1	35
311	15		1		16
312	25	9	6	1	41
313	22		1		23
316	4	4	4		12
IMR total	100	18	13	2	133
400	26	6	4		36
404	18	14	4	1	37
411	19	4	8		31
421	75	24	17	1	117
425	38	3	13	4	58
IAT total	176	51	46	6	279
CRR	8	4	2	0	14
CCST	17	16	1	1	35
NBS total	423	184	78	11	696

Table 14. Continued

Series B. International

	No	Yes		NA	Total
		Travel	Other		
Dir. office					0
IBS	16	6		2	24
IMR	6	1	2	1	10
IAT	17	5	4	2	28
CRR	3	1			4
CCST	2	1			3
NBS total	44	14	6	5	69

Series C. Standards Policy

Dir. office	12				12
IBS	11	3	1	2	17
IMR	3	3		1	7
IAT	16	2	5	2	25
CRR	3				3
CCST	6	1	1		8
NBS total	51	9	7	5	72

Table 16. Availability or Training of Replacement

16. Are there others within NBS that are being groomed to take over this committee activity or who could take over now?

☐ Yes ☐ No

Series A. Domestic

	YES	NO	NA	Total
Dir. Office	6	6	0	12
200	5	9		14
211	18	18	3	39
212	16	46	3	65
213	21	19	9	49
271	10	5		15
272	21	17	3	41
IBS total	91	114	18	223
300	6			6
310	17	17	1	35
311	7	9		16
312	7	32	2	41
313	15	8		23
316	6	6		12
IMR total	58	72	3	133
400	16	20		36
404	23	13	1	37
411	9	22		31
421	65	51	1	117
425	38	18	2	58
IAT total	151	124	4	279
CRR	4	9	1	14
CCST	21	14	0	35
NBS total	331	339	26	696

Table 16. Continued

Series B. International

	YES	No	NA	Total
Dir. office				0
IBS	9	13	2	24
IMR	1	8	1	10
IAT	11	15	2	28
CRR		4		4
CCST	2	1		3
NBS total	23	41	5	69

Series C. Standards Policy

Dir. office	3	9		12
IBS	9	5	2	16
IMR	4	2	1	7
IAT	14	11		25
CRR	2	1		3
CCST	5	3		8
NBS total	37	31	3	71

Table 17. Primary Input to Committee
(Series A only)

17. How would you describe your primary input to the committee?

(a) Technical advice ☐

(b) supporting R & D (lab work) ☐

(c) administrative ☐ Check only one

(d) financial ☐

(e) NBS seal of approval ☐

(f) OTHER (Specify) _____

Series A. Domestic

	(a)	(b)	(c)	(d)	(e)	(f)	NA		Total
Dir. Office	9	0	2	0	0	0	1		12
200	12		2						14
211	34		2			1	2		39
212	43	4	13		1	2	2		65
213	43	1	2		2	1			49
271	12	2				1			15
272	35		3			3	1		42
IBS total	179	7	22	0	3	8	5		224
300	4	1	1						6
310	24	10	1						35
311	14		2						16
312	34	3	2				2		41
313	17	3	3						23
316	9		1			1	1		12
IMR total	102	17	10	0	0	1	3		133
400	27	3	2			4			36
404	19	15	1			1	1		37
411	22	1	2			5	1		31
421	83	10	10		3	9	2		117
425	36	7	8			7			58
IAT total	187	36	23	0	3	26	4		279
CRR	12	0	1	0	0	1	0		14
CCST	22	3	1	0	1	8	0		35
NBS total	501	63	59	0	7	44	13		697

Table 21. Rewards for Participation

21. How has your participation in this committee been rewarded?

(a) significant factor in promotion ☐

(b) increased prestige at NBS ☐

(c) increased prestige in professional community ☐

(d) no apparent reward ☐

(e) OTHER (Specify) _____

Series A. Domestic

	(a)	(b)	(c)	(d)	(e) satis.*	(e) other	NA	Total
Dir. Office	0	1	1	7	1	0	3	13
200	1	1	6	6				14
211		1	11	10	3	4	10	39
212		2	8	48	4	1	2	65
213		4	19	13	1	13	4	54
271		1	5	5		4		15
272	3	9	10	23	1	3	3	52
IBS total	4	18	59	105	9	25	19	239
300			2	2		1	1	6
310		1	23	7		3	1	35
311	4	2	7	3				16
312		1	19	12		9	1	42
313			12	6	3	2		23
316			3	5	1	3		12
IMR total	4	4	66	35	4	18	3	134
400	1	2	11	14		11		39
404		5	7	18		8	1	39
411			21	7	1	2		31
421	2	15	58	36		20	4	135
425		3	10	34		11	2	60
IAT total	3	25	107	109	1	52	7	304
CRR	0	0	5	7	2	0	0	14
CCST	5	6	11	8	2	10	4	46
NBS total	16	54	249	271	19	105	36	750

* "personal satisfaction" or equivalent comment.

NOTE: More than one answer was allowed.

Table 21. Continued

Series B. International

	(a)	(b)	(c)	(d)	(e) satis.	(e) other	NA	Total
Dir. office								0
IBS		1	19	4		2		26
IMR	1		4	3		1	1	10
IAT	1	3	9	12		4	2	31
CRR			2	1	1			4
CCST		2	2					4
NBS total	2	6	36	20	1	7	3	75

Series C. Standards Policy

Dir. office		2			2	8		12
IBS		3	7	1		5		16
IMR		3	3			1		7
IAT	2	9	11		3	1		26
CRR	1	1	1					3
CCST			3		4	1		8
NBS total	3	18	25	1	9	16		72

Dr. Sorrows

Appendix C
Exhibit B

U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards
Washington, D.C. 20234

Date: January 8, 1970

Reply to Attn of:

Subject: Cost of NBS Participation on Voluntary Standards Committees

To: Associate Director for Administration
Associate Director for Information Programs
Institute and Center Directors

Recent publication of Technical and Scientific Committee Memberships of NBS Staff by the Office of Engineering Standards Liaison has focused attention on the extensive range of NBS participation in scientific and technical activity with both national and international standards.

Estimates of funds used to support voluntary standards activities of NBS staff are not available. Such estimates of costs incurred by NBS in developing voluntary standards would be useful in a variety of purposes. In FY 71 we expect to accumulate such costs routinely by appropriate modification of the accounting system. Before then, however, we do need some data and I propose that it be obtained as follows: Each division and office should estimate the costs of staff participation on committees which are directly or indirectly concerned with developing voluntary standards. Such estimates should include:

1) the salary costs and related overheads associated with
   a) preparing and reviewing draft standards, and
   b) preparation, attendance and follow-up of committee meetings
2) travel costs.

Each participant should estimate the cost of his participation during Fiscal Year 1969 and anticipate costs for FY 1970. Estimates should be prepared in the following format:

Division _____

Participant's Name	Standards Committees --- RTS Funds FY 69	RTS Funds FY 70	Overhead Projects FY 69	Overhead Projects FY 70	Estimated Costs Other Projects FY 69	Other Projects FY 70

Reports should be consolidated by division and forwarded through the Institute or Center office to OESL, Room A400 Admin, by January 30, 1970.

JAN 15 1970

Attached are four copies of a January 1970 print out of committee activities and a copy of the Directory with information available in June 1969. One copy of the print out should be returned with the report including deletions, additions and corrections. Committees concerned with developing standards or standards policy should be asterisked*.

Mr. F. McManus, Ext. 2696, will be available to answer questions arising from this request.

L. M. KUSHNER
Deputy Director

Attachments

cc: Mr. McManus

Appendix D

U.S. Industry Standards Related to Television Receivers

American National Standards Institute Standards (ANSI)

C9.100-1968	Magnetic Wire (NEMA MW 1000-1967)
C16.5-1954	(R1961) Volume Measurements of Electrical Speech and Program Waves (53 IRE 3.S2; IEEE 152-1953)
C16.13-1961	Testing Monochrome Television Broadcast Receivers, Methods of (60 IRE 17.S1; IEEE 190-1960)
C16.29-1957	Gain, Amplification, Loss, Attenuation, and Amplitude-Frequency-Response, Methods of Measurement of (56 IRE 3.S1; IEEE 150-1956)
C33.1-1968	Flexible Cord and Fixture Wire, Safety Standard for (UL 62-October 1968)
C33.46-1968	Printed-Wiring Boards, Safety Standard for (UL 796-July1968)
C33.55-1969	Radio and Television Receiving Appliances, Safety Standard for (UL 492-June 1969)
C59.3-1968	D-C Resistance or Conductance of Insulating Materials, Methods of Test for (ASTM D257-66) (IEC 93 and 167)
C59.11-1955	Impact Resistance of Plastics and Electrical Insulating Materials, Methods of Test for (ASTM D256-56)
C59.13-1968	Testing Rigid Sheet and Plate Materials Used for Electrical Insulation, Method of (ASTM D229-67T)
C59.14-1969	Testing Laminated Tubes Used for Electrical Insulation, Methods of (ASTM D348-68)
C59.16-1969	Laminated Thermosetting Materials, Specifications for (ASTM D709-67)
C59.26-1958	Natural Block Mica and Mica Films Suitable for Use in Fixed Mica-Dielectric Capacitors, Specification for (ASTM D748-59)
C59.40-1967	Polyethylene Molding and Extrusion Materials, Specifications for (ASTM D1248-65T)
C59.42-1963	Power Factor and Dielectric Constant of Natural Mica, Method of Test for (ASTM D1082-54)
C59.45-1963	Solid Filling and Treating Compounds Used for Electrical Insulation, Methods of Testing (ASTM D176-59)
C59.48-1968	Dielectric Breakdown Voltage and Dielectric Strength of Electrical Insulating Materials at Commercial Power Frequencies, Methods of Test for (ASTM D149-66)
C59.71-1965	Natural Muscovite Mica Splittings, Specifications for (ASTM D2131-65)
C59.73-1967	Testing Vitrified Ceramic Materials for Electrical Applications, Methods of (ASTM D116-65)
C59.79-1968	Tensile Strength of Molded Electrical Insulating Materials, Method of Test for (ASTM D651-48 1966)
C59.80-1969	Cleaning Plastic Specimens for Insulation Resistance, Surface Resistance and Volume Resistivity Testing, Practice for (ASTM D1371-68)
C59.81-1968	Dielectric Proof-Voltage Testing of Thin Solid Electrical Insulating Materials, Method for (ASTM D1389-62)
C60.1-1964	Electron Tubes, Bases, Caps and Terminals (including Gages), Dimensional Characteristics of (EIA RS-209-A-1963) (Revision and Consolidation of C60.1-1956, C60.2-1956, and C60.7-1956)
C60.6-1959	Direct Interelectrode Capacitance, Measurement of (EIA RS-191-A-1959)(IEC 100)
C60.8-1963	Interelement Capacitance for Electron Tubes, Rating Values of (EIA RS-263-1962)
C60.9-1964	Terms for Electron Tubes, Definitions of (62 IRE 7.S2) (IEC 67 and IEC 151-7)
C60.15-1963	Electron Tubes, Methods of Testing (62 IRE 7S1; IEEE 158-1962)
C81.1-1951	Rolled Threads for Screw Shells of Electric Lampholders and for Screw Shells of Unassembled Lamp Bases, Dimensions for
C83.1-1969	Colors for Identification and Coding (EIA RS-359 August 1968)
C83.2-1949	Components for Electronic Equipment, Preferred Values for (RETMA GEN-102-1948)
C83.3-1951	Piezoelectric Crystals, Terminology for (49 IRE 14.S1; IEEE 176-1949)
C83.4-1958	Ceramic Dielectric Capacitors Classes 1 and 2, Requirements for (EIA RS-198-1958)
C83.6-1968	Low Power, Insulated, Fixed Wire Wound Resistors (EIA RS-344-January 1968)
C83.7-1968	Variable Control Resistors, Recommendations for (EIA RS-303-May 1965)
C83.11-1968	Metal Encased Fixed Paper Dielectric Capacitors for D-C Applications, Requirements for (EIA RS 218A-July 1967)
C83.13-1968	Wire-Wound Power-Type Rheostats, Requirements for (EIA RS-322-October 1965)
C83.18-1969	Fixed Wire-Wound Resistors (EIA RS-155-A March 1966)

C83.22-1960	Polarized Dry Aluminum Electrolytic Capacitors for General Use, Requirements for (EIA RS-154B)
C83.23-1960	Determination of the Elastic, Piezoelectric, and Dielectric-Constants- The Electromechanical Coupling Factor of Piezoelectric Crystals, Method for the (58 IRE 14.S1; IEEE 178-1958)
C83.26-1968	Rotary Switches (EIA RS 315-July 1965)
C83.28-1968	Glass Coated Thermistor Beads and Thermistor Beads in Glass Probes and Glass Rods (Negative Temperature Coefficient), General Specification for (EIA RS-357-July 1967)
C83.29-1968	Fixed Paper and Fixed Paper Polyester Film Dielectric Capacitors in Non-metallic Cases for DC Application (EIA RS-164A November 1967)
C83.30-1968	Wirewound Variable Resistors (EIA RS-333-January 1967)
C83.32-1968	Fixed, Wirewound, Precision Resistors (EIA RS-229A-May 1965)
C83.33-1968	Fixed Electrolytic Tantalum Capacitors (EIA RS-228A April 1967)
C83.37-1968	Chassis Wiring, Color Coding of (EIA RS-336 April 1967)
C83.41-1968	Varistors, Symmetrical, Nonlinear (EIA RS-350 April 1968)
C83.42-1968	Varistor Definitions and Test Methods (EIA RS-349 April 1968)
C83.44-1968	Resistors, Variable Wirewound (Lead-Screw Actuated) (EIA RS-345 February 1968)
C83.47-1969	Resistors, Variable (Lead-Screw Actuated) Non-Wirewound (EIA RS-360 July 1968)
C83.48-1970	Fixed Composition Resistors (EIA RS-172-A June 1968)
C83.50-1969	Holder Outlines and Pin Connections for Quartz Crystal Units (EIA RS-192A February 1967)
C83.51-1969	Loudspeakers, Dynamic, Magnetic Structures and Impedance (EIA RS-299A October 1968)
C83.52-1969	Type Designations for Receiver Type Tube Sockets (EIA RS-167B September 1965)

Electronic Industries Association Standards (EIA)

Electron Tubes (From JEDEC* list)

5-D	1961	Index of Electron Tubes Registered in the "5500" Series
7-A	1961	Registered Bases, Caps, Terminals and Gauges for Electron Tubes
23	1962	Glossary Terms Used in the Description of Glass Components and their Defects
24	1962	Recommended Practice for Preparation of Outline Drawings--Electron Tube Glass Bulbs
25-A	1964	Characteristic Data of Common Glasses
26	1962	Soft Glass Tubing and Cane Criteria and Tables
27	1962	Hard Glass Tubing and Cane Criteria
28	1963	Soft Glass Bulb Criteria and Bulb Outlines
29	1963	Hard Glass Bulb Criteria and Bulb Outlines
30	1964	Molded Flare Criteria and Outlines
31-A	1966	Criteria of Bulbs and Implosion Panels for Television Picture Tubes
32	1961	Cathode Ray Tube Neck Alignment Gauge G-140
37	1962	The Design - Maximum Rating System for Electron Tubes
38	1962	Noise Figure Testing of RF Amplifier Tubes
39	1963	Ion Trap Magnets No. 111 and 117 Focusing Coils Nos. 106, 109, and 122.
40	1963	Proposed Acceptance Sampling for Small Lots
41	1963	A Guide for Pulse Rating Low Power Vacuum Tubes
46	1964	Philosophy of Vibrating Testing of Receiving Tubes
50	1964	Relative Spectral Response Data for Photosensitive Devices ("S" Curves)
52		Electron Tube REgistration List
62	1966	Typical JEDEC Picture Tube Screen Dimensions
64	1967	Recommended Practice for Measurement of X-Radiation from Display Cathode Ray Tubes
66-A	1969	Method of Test and Criteria for Multi-Angle Two-Parameter Specular Gloss Measurement of Color TV Safety Panels
67	1968	Recommended Practice for Measurement of X-Radiation from Receiving Tubes
68	1968	Glossary of Recommended Quality Control and Reliability Terms for Electron Tubes
72	1969	Recommended Practice for Conversion of U.S. to Metric Dimensions for Color and Monochrome Cathode Ray Tubes and their Component Parts
73	1969	Recommended Practice for Quality Control of X-Radiation Emitted from High Voltage Rectifier and Shunt Regulator Receiving Tubes

*Joint Electron Device Engineering Council of Electronic Industries Association

Semiconductor Devices

12-F	1968	Registered Outlines and Gauges for Semiconductor Devices
19	1960	The measurement of Thermal Resistance of Semiconductor Devices
53		Semiconductor Device Registration List
59	1966	A Guide to the Preparation of Semiconductor Detail Specifications in MIL-S-19500 Format
60	1966	Preferred Lead Configuration for High-Frequency Bipolar Transistors
63	1967	Preferred Lead Configuration for Triode or Triode-Connected Field-Effect Transistors
65	1967	Test Procedures for Verification of Maximum Ratings of Power Transistors
69	1969	Preferred Lead Configuration for Quadruple-Triode Junction Field Effect Transistors
74	1969	Standard List of Values to be Used in Power Transistor Device Registration and Minimum Differences for Discreteness of Registration
75	1969	Letter Symbols for Use with Infrared Devices
77	1969	JEDEC Recommendations for Letter Symbols, Abbreviations, Terms, and Definitions for Semiconductor Device Data Sheets and Specifications

EIA Recommended Standards

RS-153-A	1964	Molded and Dipped Mica Capacitors (Wire Lead Styles)
*RS-154-B	1960	Polarized Dry Aluminum Electrolytic Capacitors for General Use (Rev. of RS-154 A)(ANSI C83.22-1962)
*RS-155-A	1966	Fixed Wirewound Resistors (Rev. of RS-155)(ANSI C83.18-1969)
RS-157	1957	Method for Determining Air Gap Flux Density and Energy
RS-161	1956	Unit Standards for Ceramic Based Printed Circuits
RS-162	1956	Test Standard for Ceramic Based Printed Circuits
RS-163	1956	RF Radiation Label
*RS-164-A	1967	Fixed Paper and Fixed Paper Polyester Film Dielectric Capacitors in Nonmetallic Cases for DC Application (Rev. of RS-164)(ANSI C83.29-1968)
RS-165-A	1958	Ceramic Dielectric Capacitors, Class 1 & 2, 1000-7500 Volt Rating
*RS-167-C	1969	Type Designation for Receiver Type Tube Sockets (Rev. of RS-167-B)(ANSI C83.52 1969)
RS-168-A		Dimensional and Electrical Characteristics Defining Tube and Transistor Sockets (NOW CONTAINED IN RS-367)
RS-169	1956	Thermoplastic and Insulated Jacketed Hookup Wire
RS-171	1956	High Voltage Ceramic Dielectric Capacitors, Class 2 (Reaffirmed January 1963)
*RS-172-A	1969	Fixed Composition Resistors (Rev. of RS-172) (ANSI C83.48-1970)
RS-174	1956	Audio Transformers for Electronic Equipment (Rev. of TR-121)
RS-175	1956	Audio Inductors (Rev. of TR-122)
RS-178-A	1963	Solderability Test Standard
RS-179	1957	Classification of Tube Testers
RS-180	1957	Power Transformers for Electronic Equipment (Rev. of TR-102-B)
RS-182	1957	Class A Variable Air Capacitors (Reaffirmation of REC-106-A)
RS-183	1957	Output Transformers for Radio Broadcasting Receivers (Reaffirmation of REC-124)
RS-184	1957	Drive Pulleys (Rev. of REC-102-A)(Reaffirmed April 1969)
RS-185		Dimensional and Electrical Characteristics Defining Miniature Receiver Type Tube Sockets for Printed Circuits (NOW CONTAINED IN RS-367)
RS-186-C	1965	Standard Test Methods for Electronic Component Parts (Rev. of RS-186-B)
RS-188	1957	Standard Dimensional System for Automation Requirements
RS-190-A	1964	Pin Straighteners and Wiring Jigs for Electron Tubes (Revision of RS-190)
*RS-191-B	1964	Measurement of Direct Interelectrode Capacitances (Rev. of RS-191-A)
*RS-192-A	1967	Holder Outlines and Pin Connections for Quartz Crystal Units (ANSI C83.50-1969)
RS-196	1957	Fixed Film Resistors (High Stability)
RS-197	1957	Power Filter Inductors for Electronic Equipment (Rev. of TR-110-B)
*RS-198	1957	Ceramic Dielectric Capacitors, Classes 1 & 2, up to 500 Volts (Rev. of REC-107 -A)(ANSI C83.4-1958)
RS-202-A	1964	Recommended Practice for Preparation of Outline Drawings of Electron
RS-206-B	1966	Recommended Practice for Preparation of Basing or Terminal Diagrams (Rev. of RS-206-A)
RS-207	1958	Television Tuner Performance Presentation and Measurement

*In ANSI List

EIA Recommended Standards (Cont.)

RS-208	1958	Definition and Register, Printed Wiring
*RS-209-A	1963	Standards for Electron Tubes - Section 1, Dimensional Characteristics, Section 2, Bases, Caps and Terminals, Section 3, Gauges (ANSI C60-1-1965)
RS-209-A-1	1965	Supplement No. 1 to RS-209-A
RS-209-A-2	1968	Supplement No. 2 to RS-209-A
RS-212-A	1961	Numbering of Electrodes and Designation of Units in Electron Tubes (Rev. of RS-212)
RS-213	1958	Test Point Locations for Printed Wiring Assemblies
RS-214	1958	Method for Calculation of Current Ratings on Hookup Wire
RS-216	1959	Standard Method of Test for Adhesion of Printed Wiring
RS-217-A	1961	Wound Cut Cores (Rev. of RS-217) (Reaffirmed April 1969)
*RS-218-A	1967	Metal Encased Fixed Paper Dielectric Capacitors for D.C. Application (Rev. of RS-218)(ANSI C83.11-1968)
*RS-228-A	1967	Fixed Electrolytic Tantalum Capacitors (Rev. of RS-228)(ANSI C83.33-1968)
*RS-229-A	1965	Fixed, Wirewound, Precision Resistors (Rev. of RS-229) (ANSI C83.32-1968)
RS-230	1959	Color Marking of Thermoplastic Covered Wire (Rev. of GEN-104)
RS-231	1959	Reverse Recovery Time Measurement on Semiconductor Diodes (NEMA Publication No. SK 500-1959)
RS-233-A	1965	Phasing of Receiver Loudspekaers (Rev. of RS-233)
RS-236-B	1968	Color Coding of Semiconductor Devices (Diodes and Rectifiers)(Rev. of RS-236-A) (NEMA Publication SK 502-1968)
RS-242	1961	Definitions for Electromagnetic Delay Lines (Reaffirmed April 1969)
**RS-245-A		Letter Symbols and Abbreviations for Semiconductor Device Data Sheets and Specifications (NEMA Publication No. SK 53-1966)(Now Contained in JEDEC Publication No. 77)
RS-246	1961	Environmental Method of Life Testing Lead Mounted Semiconductor Power Rectifiers (NEMA Publication No. SK-54-1961)
RS-248	1961	Case Temperature Measurements by Manufacturers of Hex Base Silicon Rectifiers (NEMA Publication No. SK 52-1961)
RS-249	1961	Temperature Measurements by Users of Silicon Rectifiers (NEMA Publication No. SK 55-1961)
RS-251	1961	Test to Determine Temperature Rise as a Function of Current in Printed Conductors
RS-253	1961	Temperatures for Electrical Measurement Rating Specification - Semiconductor Devices (NEMA Publication No. SK 56-1961)
RS-255	1962	Simulated Life Test Circuit for Semiconductor Rectifier Diodes (NEMA Publication No. SK 57-1962)
RS-256-A	1965	Deflecting Yokes for Cathode Ray Tubes (Rev. of RS-256)
RS-262	1962	Semiconductor Power Rectifier Diodes Class of Service Environmental and Test Requirements (NEMA Publication No. SK 58-1962)
*RS-263	1962	Rating Values of Interelement Capacitance for Electron Tubes (Rev. of ET-114) (ANSI C60.8-1963)
RS-265	1962	Recommended Heat Sinks (Fins) and Uniform Test Methods for Use in Testing Heat Sink Mounted Rectifier Diodes (NEMA Publication No. SK 59-1962)
RS-266	1962	Registered Screen Dimensions for Monochrome Picture Tubes
RS-266-1	1968	Method of Rounding Off of Figures for Screen Dimensions (Supplement 1 to RS-266)
RS-272	1963	Definition and Measurement of Voltage Regulator and Reference Tubes
RS-278-A	1965	Mounting Dimensions for Loudspeakers (Rev. of RS-278)
RS-279	1963	Color Code for Film Resistors
RS-282	1963	Standards for Silicon Rectifier Diodes and Stacks (NEMA Publication No.SK 60 1963)
RS-283	1963	Test Method for Transistor Noise Figure Measurements at Medium Frequencies (NEMA Publication No. SK 503-1963)
RS-284	1963	Test Methods for the Collector-Base Time Constant and for the Resistive Part of the Common-Emitter Input Impedance (NEMA Publication No. SK 504-1963)
RS-286	1963	Standard for Forward Transient Measurement in Semiconductor Devices (NEMA Publication No. SK 501-1963)
RS-289	1963	Conditions Under Which Stud or Base Mounted Silicon Rectifier Diodes are Rated (NEMA Publication No. SK 61-1963)

*In ANSI List
**In JEDEC List

EIA Recommended Standards (cont.)

RS-290	1963	Preferred Current Ratings for Stud-Mounted Silicon Rectifier Diodes at 100°C Case Temperature (NEMA Publication No. SK 62-1963)
RS-296-A	1968	Reel Packaging of Axial Leaded Components (Rev. of RS-296)
RS-301	1965	Type Designation Systems for Electron Tubes
RS-302	1965	Ranges and Conditions for Specifying Beta for Low Power, Audio Frequency Transistors for Entertainment Service (NEMA Publication No. SK 505-1965)
*RS-303	1965	Variable Control Resistors (Adjustable Composition Resistance Units)(ANSI C83.7-1968)
RS-306	1965	Standards for Measurement of Small Signal HF, VHF and UHF Power Gain Transistors (NEMA Publication No. SK 506-1965)
RS-307	1965	Voltage Regulator Diode Noise Voltage Measurement (NEMA Publication No. SK 507-1965)
RS-308	1965	JEDEC Type Registration for Semiconductor Devices Preparation of Outline Drawings (NEMA Publication No. SK 510-1965)
RS-311	1965	Measurement of Transistor Noise Figure at HF and VHF (NEMA Publication No. SK 509-1965)
RS-314	1965	Envelope and Mounting Dimensions for Encapsulated Transformers & Inductors (Using Cores listed in Table 1 of EIA RS-217-A)
*RS-315	1965	Rotary Switches (ANSI C83.26-1968)
RS-317	1965	Reverse Recovery Time for the Reference Diode in EIA-NEMA Standard RS-321 and SK 500-1959 (NEMA Publication No. SK 512-1965)
RS-318	1965	Measurement of Recovery Time for Semiconductor Diodes (NEMA Publication No. SK 511-1965)
RS-318-1	1967	Characterization of a Reverse Recovery Test Fixture (Supplement No. 1 to RS-318)
RS-319	1965	Solderability of Printed Wiring Boards
RS-320	1965	Thermal Equilibrium Conditions for Measurement of Diode Static Parameters (NEMA Publication No. SK 513-1965)
RS-321-A	1968	Numbering of Electrodes in Multiple Electrode Semiconductor Devices and Designation of Units in Multiple Unit Semiconductor Devices (NEMA Publication No. SK 514-1968)
*RS-322	1965	Wirewound Power-Type Rheostat (Rev. of TR-133) (ANSI C83.13-1968)
RS-323	1966	Air-Convection Cooled Life Test Environment for Lead-Mounted Semiconductor Devices (NEMA Publication No. SK 515-1966)
RS-324	1966	Registered Screen Dimensions for Color Shadow Mask Picture Tubes
RS-325	1966	Ignitability and Flammability Tests Straight Cut Numerically Controlled Machines
RS-327	1966	Solvent Resistance of Applied Marking Materials
*RS-333	1967	Wirewound Variable Resistors (ANSI C83.30-1968)
RS-335	1967	Fixed Composition Capacitors
*RS-336	1967	Color Coding of Chassis Wiring (ANSI C83.37-1968)
*RS-337	1967	General Specification for Glass Coated Thermistor Beads and Thermistor Beads in Glass Probes and Glass Rods (Negative Temperature Coefficient)(ANSI C83.28-1968)
RS-340	1967	Standard for the Measurement of C_{re} for Small Signal Transistors
*RS-344	1968	Low Power, Insulated Fixed Wirewound Resistors (Rev. of REC-117)(ANSI C83.6-1968)
*RS-345	1968	Resistors, Variable, Wirewound (Lead Screw Actuated) (ANSI C83.44-1968)
*RS-349	1968	Varistor Definitions and Test Methods (ANSI C83.42-1968)
*RS-350	1968	Standard for Varistors, Symmetrical, Nonlinear (ANSI C83.41-1968)
RS-353	1968	The Measurement of Transistor Noise Figure at Frequencies up to 20 kHz by Sinusoidal Signal Generator Method
RS-354	1968	Standard for the Measurement of Transistor Equivalent Noise Voltage and Equivalent Noise Current at Frequencies up to 20 kHz
*RS-359	1968	Standard Colors for Color Identification and Coding (Rev. of GEN-101-A)(ANSI C83.1-1969)
*RS-360	1968	Resistors, Variable (Lead-Screw Actuated) Non-Wirewound (ANSI C83.47-1969)
RS-367	1969	Dimensional and Electrical Characteristics Defining Receiver Type Sockets (Rev. of RS-185 and RS-168-A)
RS-369	1969	Midget I.F. Shields (Reaffirmation of REC-144)
*GEN-102	1948	Preferred Values (Reprinted 1953)(ANSI C83.2-1961)
GEN-103	1949	Thermoplastic Hookup Wire (Class I)

*In ANSI List

EIA Recommended Standards (cont.)

REC-109-C	1955	Intermediate Frequencies for Entertainment Receivers
REC-120-A	1949	Power Transformers for Radio Broadcast Receivers--Core Laminations, Vertical and Horizontal Channel Frames
REC-127	1949	Power-Supply, Half-Wave, Metallic, Rectifier, Stack for Radio Receivers, Amplifiers, etc., (110 to 130 v, a.c.)
REC-130	1949	Test for appearance and durability of finishes on completely finished cabinets made of solid wood and/or veneer
REC-140	1954	Good Engineering Practice Regarding I.F. Rejection of Television Receivers
REC-141	1954	VHF Receiving Antenna Performance, Presentation and Measurement
REC-145	1955	Packaging Tests for Television Receivers

American Society for Testing and Materials Standards (ASTM)

A 34-68		Magnetic Materials, Testing
A 219-58		Local Thickness of Electrodeposited Coatings, Test for
A 340-65		Magnetic Testing, Def. of Terms, Symbols, and Conversion Factors Relating to
A 341-64		Normal Induction and Hysteresis of Magnetic Materials, Test for
A 342-64		Permeability of Feebly Magnetic Materials, Test for
A 343-68		Alternating Current Magnetic Properties of Materials at Power Frequencies Using Wattmeter-Ammeter-Voltmeter Method and 25-cm Epstein Test Frame, Test for
A 344-68		Electrical and Mechanical Properties of Magnetic Materials, Test for
A 345-55	1964	Flat-Rolled Electrical Steel, Spec. for
A 346-64		Alternating Current Magnetic Properties of Laminated Core Specimens, Test for
A 347-58		Alternating Current Magnetic Properties of Materials Using the Modified Hay Bridge Method with 25-cm Epstein Frame, Test for
A 348-68		Alternating Current Magnetic Properties of Materials Using the Wattmeter-Ammeter-Voltmeter Method,100 to 10,000 Hz and 25-cm Epstein Frame, Test for
A 349-68		Alternating Current Magnetic Properties of Materials Using the Wattmeter-Ammeter-Voltmeter Method, 50 to 60 Hz and 50-cm Epstein Frame, Test for
A 566-68		Alternating Current Magnetic Properties of Materials Using an Alternating-Current Potentiometer and 25-cm Epstein Frame, Test for
B 63-49	1965	Resistivity of Metallically Conducting Resistance and Contact Materials, Test for
B 70-56	1965	Change of Resistance with Temperature of Metallic Materials for Electrical Heating, Test for
B 77-33	1965	Thermoelectric Power of Electrical-Resistance Alloys, Test for
B 84-65		Temperature-Resistance Constants of Alloy Wires for Precision Resistors, Test for
B 181-50	1965	Effect of Controlled Atmospheres upon Alloys in Electric Furnaces, Test for
B 182-49	1965	Life Test of Electrical Contact Materials
B 193-65		Resistivity of Electrical Conductor Materials, Test for
B 267-68		Wire for Use in Wire-Wound Resistors, Spec. for
B 277-55	1965	Hardness of Electrical Contact Materials, Test for
B 476-68		Wrought Precious Metal Electrical Contact Materials, Spec. for
B 477-68		Gold, Silver, Nickel Electrical Contact Alloy, Spec. for
C 528-63 T		Compressive Strength of High-Strength Ceramic Materials, Test for
*D 116-69		Vitrified Ceramic Materials for Electrical Applications, Testing
*D 149-64		Dielectric Breakdown Voltage and Dielectric Strength of Electrical Insulating Materials at Commercial Power Frequencies, Tests for
*D 176-59	1967	Solid Filling and Treating Compounds Used for Electrical Insulation, Testing
*D 229-69		Rigid Sheet and Plate Materials Used for Electrical Insulation, Testing
*D 256-56	1961	Impact Resistance of Plastics and Electrical Insulating Materials, Tests for
*D 257-66		D-C Resistance or Conductance of Insulating Materials, Tests for
*D 348-68		Laminated Tubes Used for Electrical Insulation, Testing
*D 651-48	1966	Tensile Strength of Molded Electrical Insulating Materials, Test for
*D 709-67		Laminated Thermosetting Materials, Spec. for
*D1082-54		Power Factor and Dielectric Constant of Natural Mica, Test for
*D1248-69		Polyethylene Plastics Molding and Extrusion Materials, Spec. for
*D1371-68		Cleaning Plastic Specimens for Insulation Resistance, Surface Resistance, and Volume Resistance Testing, Rec. Practice for
*D2131-65		Natural Muscovite Mica Splittings, Spec. for

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ASTM Standards (Cont.)

E 129-61 1966 Thermionic Nickel Alloys by the Powder--D-C Arc Technique, Spectrochemical Analysis of
F 1-68 Nickel-Clad and Nickel-Plated Steel Strip for Electron Tubes, Spec. for
F 2-68 Aluminum-Clad Steel Strip and Nickel-Steel-Aluminum Composite Strip for Electron Tubes, Spec. for
F 3-68 Nickel Strip for Electron Tubes, Spec. for
F 4-66 Carbonized Nickel Strip and Carbonized Nickel-Plated and Nickel-Clad Steel Strip for Electron Tubes, Spec. for
F 5-60 1968 Volatile Content of Germanium Dioxide, Test for
F 6-60 1968 Bulk Density of Germanium Dioxide, Test for
F 7-68 Aluminum Oxide Powder, Spec. for
F 8-64 Testing Electron Tube Materials Using Reference Triodes, Rec. Practice for
F 9-66 T Round Wire for Use as Grid Siderods in Electron Tubes, Spec. for
F 10-67 T Miniature Electron Tube Leads, Spec. for
F 11-66 1968 Testing Electron Tube Parts by Means of a Reference Planar Diode, Rec. Practice for
F 12-68 Mica Bridges for Electron Tubes, Spec. for
F 13-65 Disk Cathode Assemblies, Spec. for
F 14-68 Making and Testing Reference Glass-Metal Bead-Seal, Rec. Practice for
F 15-68 Iron-Nickel-Cobalt Sealing Alloy, Spec. for
F 16-67 Diameter or Thickness of Wire and Ribbon for Electronic Devices and Lamps, Measuring
F 18-64 Glass-to-Metal Headers Used in Electron Devices, Spec. and Method for Eval. of
F 19-64 Tension and Vacuum Testing Metallized Ceramic Seals
F 20-66 High Conductivity Composite Aluminum-Steel-Copper Strip for Electron Tubes, Spec. for
F 21-65 Hydrophobic Surface Films by the Atomizer Test, Test for
F 22-65 Hydrophobic Surface Films by the Water-Break Test, Test for
F 23-64 Temperature Measurement of Thermionic Emitters, Rec. Practice for
F 24-65 Measuring the Counting Particulate Contamination on Surfaces
F 25-68 Sizing and Counting Airborne Particulate Contamination in Clean Rooms & Other Dust-Controlled Areas Designed for Electronic and Similar Applications
F 26-66 Determining the Orientation of a Semiconductive Single Crystal
F 27-68 Preparing a Test Ingot of Germanium by the Hydrogen Reduction of Germanium Dioxide
F 28-66 Measuring the Minority-Carrier Lifetime in Bulk Germanium and Silicon
F 29-68 Dumet Wire for Glass-to-Metal Seal Applications, Spec. for
F 30-68 Iron-Nickel Sealing Alloys, Spec. for
F 31-68 42 percent Nickel-6 percent Chromium-Iron Sealing Alloy, Spec. for
F 32-68 Scratch-Adhesion Testing of Cathode Coatings, Rec. Practice for
F 33-63 T Determination of Gas Content of Strip Materials, Rec. Practice for
F 35-68 Identification of Minute Crystalline Particle Contaminants by X-Ray Diffraction, Rec. Practice for
F 40-68 Monocrystalline Test Ingots of Silicon by the Vertical Pulling (Czochralski) Technique, Preparing
F 41-68 Monocrystalline Test Ingot of Silicon by the Floating-Zone Technique, Preparing
F 42-68 T Conductivity Type of Semiconductors, Test for
F 43-67 T Resistivity of Semiconductor Materials, Test for
F 44-68 Metallized Surfaces on Ceramic, Spec. for
F 45-64 T Oxygen Content of Silicon, Test for
F 46-64 T Resistivity of Thermoelectric Materials, Test for
F 47-68 Crystallographic Perfection of Silicon by Preferential Etch Techniques, Test for
F 48-68 Dimensioning Mica Bridges, Rec. Practices for
F 49-68 Molybdenum Strip for Electron Tubes, Spec. for
F 50-65 T Continuous Counting and Sizing of Airborne Particles in Dust Controlled Areas by the Light-Scattering Principle (for Electronic and Similar Applications), Test for
F 51-68 Sizing and Counting Particulate Contaminant in and on Clean Room Garments
F 52-65 T Silting Index of Fluids for Processing Electron and Microelectronic Devices, Test for
F 53-68 Measurement of Sublimation from Thermionic Emitters, Rec. Practice for

ASTM Standards (Cont.)

F 57-68	Concentrating and Measuring Trace Quantities of Copper in High-Purity Water Used in the Electronics Industry
F 58-68	Specific Resistivity of Electronic Grade Solvents, Measuring
F 59-68	Identification of Metal Particulate Contamination Found in Electronic and Microelectronic Components and Systems Using the Ring Oven Technique, with Spot Tests
F 60-68	Detection and Enumeration of Microbiological Contaminants in Water Used for Processing Electron and Microelectronic Devices
F 61-68	Phosphate in Electronic Grade Hydrogen Peroxide Solutions, Test for
F 62-68	Tin in Electronic Grade Hydrogen Peroxide Solutions, Test for
F 63-68	Electron Grade Soluble Cellulose Nitrate, Spec. for
F 65-68	Primary Amyl Acetate (Mixed Isomers) for Use in Fabricating Electron Devices, Spec. for
F 66-66 T	Physical Properties of Photoresist Used in Microelectronic Fabrication, Test
F 68-68	Oxygen-Free Copper in Wrought Forms for Electron Devices, Spec. for
F 69-68	Diethyl Oxalate for Use in Fabricating Electron Devices, Spec. for
F 70-68	Cathode Carbonates, Spec. for
F 71-68	Using the Morphological Key for the Rapid Identification of Fibers for Contamination Control in Electron Devices and Microelectronics, Method of Test
F 72-66 T	Gold Wire for Semiconductor Lead-Bonding, Spec. for
F 73-66 T	Tungsten-Rhenium Alloy Wire for Electron Devices and Lamps, Spec. for
F 76-68	Measuring Hall Mobility in Extrinsic Semiconductor Single Crystals
F 77-67 T	Apparent Density of Ceramics for Electron Device and Semiconductor Application, Test for
F 78-67 T	Calibration of Helium Leak Detectors by Use of Secondary Standards
F 79-67 T	Type 101 Sealing Glass, Spec. for
F 80-67 T	Crystallographic Perfection of Epitaxial Deposits of Silicon by Etching Techniques, Test for
F 81-67 T	Bulk Semiconductor Radial Resistivity Variation, Test for
F 83-67 T	Definition and Determination of Thermionic Constants of Electron Emitters, Rec. Practice for
F 84-68 T	Resistivity of Silicon Slices Using Four Pointed Probes, Test for
F 85-67 T	Nomenclature for Wire Leads Used as Conductors in Electron Tubes, Rec. Practice for
F 91-68 T	Testing for Leaks in the Filters Associated with Laminar Flow Clean Rooms and Clean Work Stations by Use of a Condensation Nuclei Detector, Rec. Practice for
F 93-68 T	Preparation of Specifications for Procurement of Photomasks, Rec. Practice for
F 94-68 T	Aluminum in Electronic Grade Hydrogen Peroxide, Test for
F 95-68 T	Thickness of Epitaxial Layers of Silicon on Substrates of the Same Type by Infrared Reflectance, Test for
F 96-68	Electronic Grade Alloys of Copper and Nickel in Wrought Form, Spec. for
F 97-68 T	Hermeticity of Electronic Devices by Dye Penetration, Test for
F 98-68 T	Hermeticity of Electronic Devices by a Bubble Test, Test for
F 100-68 T	Shrinkage Stresses in Plastic Embedment Materials Using a Photoelastic Technique for Electronic and Similar Applications, Test for
F 101-68 T	Composite Strip of Iron-Nickel-Cobalt Alloy and Copper for Use in Electron Devices, Spec. for
F 102-68 T	Emissive Carbonates by the Powder D-C Arc Technique, Spectrochemical Analysis of
F 113-65	Stiffness Testing of Wire for Electron Devices and Lamps
F 128-66	Sleeves and Tubing for Electron Tube Cathodes, Testing
F 155-65	Temper of Strip and Sheet Metals for Electronic Devices (Springback Method), Test for
F 180-50 1968	Density of Fine Wire and Ribbon for Electronic Devices, Test for
F 204-50	Surface Flaws in Tungsten Seal Rod and Wire, Test for
F 205-63	Diameter of Fine Wire by Weighing, Measuring
F 218-68	Stress in Glass, Analyzing
F 219-67	Fine Round and Flat Wire for Electron Devices and Lamps, Testing
F 238-64	Cathode Melt Prove-In Testing, Rec. Practice for
F 239-68	Nickel Alloy Cathode Sleeves for Electron Devices, Spec. for
F 256-53	17 Percent Chromium-Iron Alloy for Sealing to Glass, Spec. for

ASTM Standards (Cont.)

F 257-53	28 Percent Chromium-Iron Alloy for Sealing to Glass, Spec. for
F 269-60 1968	Sag of Tungsten Wire, Test for
F 270-56 1968	Testing Relative Thermionic Emissive Properties of Electron Tube Materials Using a Reference Cylindrical Diode, Rec. Practice for
F 278-66 1968	Sublimation Characteristics of Metallic Materials in Cathode Sleeve Form by Electrical Resistance, Test for
F 288-66 T	Tungsten Wire for Electron Devices and Lamps, Spec. for
F 289-60 1968	Molybdenum Wire Under 20 Mils in Diameter, Spec. for
F 290-68	Round Wire for Winding Electron Tube Grid Laterals, Spec. for
F 300-64	Interface Impedance Characteristics of Electron Tube Cathodes, Measuring
F 652-68	Mica Stamping or Substitutes Used in Electron Devices and Lamps, Measuring

Institute of Electrical and Electronic Engineers Standards (IEEE)

59	Semiconductor Rectifier Components (Dec. 1962)
102	Transistors, Semiconductor Definitions and Letter Symbols Test Code for (8/57) (AIEE 425)
*150	Audio Systems and Components, Methods of Measurement of Gain, Amplification, Loss, Attenuation, and Amplitude-Frequency-Response on (ANSI C16.29-1957) (56 IRE 3 S1)
151	Audio, Definitions of Terms for (Feb. 1965)
*152	Volume Measurements of Electrical Speech and Program Waves, Recommended Practice for (ANSI C16.5-1954, R1961), (53 IRE 3 S2)
*158	Electron Tubes, Methods of Testing (ANSI C60.15-1963),(62 IRE 7 S1)
160	Electron Tubes, Definitions of Terms for (57 IRE 7 S2)
*161	Electron Tubes, Definitions of Terms for (ANSI C 60.9-1964), (62 IRE 7 S2)
170	Modulation Systems, Definitions of Terms for (May 1964)
*176	Piezoelectric Crystals (ANSI C83.3-1951, R1961), (49 IRE 14 S1)
177	Piezoelectric Vibrators, Definitions and Methods of Measurements of (May 1966)
*178	Piezoelectric Crystals, Determination of the Elastic, Piezoelectric, and Dielectric Constants of, also the Electromechanical Coupling Factor (ANSI C83.23-1960), (58 IRE 14 S1)
189	Spurious Radiation from Frequency Modulation and Television Broadcast Receivers, Open Field Method of Measurement of (51 IRE 17 S1)
*190	Monochrome Television Broadcast Receivers, Methods of Testing (ANSI C16.13-1961), (60 IRE 17 S1)
191	Noise, Methods of Measurement of (53 IRE 19 S1)
201	Television: Color Terms, Definitions of (55 IRE 22 S1)
202	Television: Aspect Ratio and Geometric Distortion, Methods of Measurement of (54 IRE 23 S1)
204	Television, Definitions of Terms Relating to (61 IRE 23 S1)
205	Television: Luminance Signal Levels, Measurement of (58 IRE 23 S1)
206	Television: Differential Gain and Differential Phase, Measurement of (60 IRE 23 S1)
208	Video Techniques: Resolution of Camera Systems, Measurement of (60 IRE 23 S2), (Revision of Part II of 50 IRE 23 S1)
213	Radio Interference: Conducted Interference Output to the Power Line from FM and Television Broadcast Receivers in the Range of 300 kc to 25 mc, Methods of Measurement of (61 IRE 27 S1)
216	Semiconductor Terms, Definitions of (60 IRE 28 S1)
218	Transistors, Methods of Testing (56 IRE 28 S1)
219	Loudspeaker Measurements, Recommended Practice for (ANSI S1.5 1963), (61 IRE 30 RP1)
220	Junction Transistors for Large Signal Applications, Methods of Testing (AIEE/IRE JS-2-1962)
225	Minority-Carrier Lifetime in Germanium and Silicon by the Method or Photoconducting Decay, Measurement of (AIEE/IRE JS-7, 1962), (61 IRE 28 S2)
226	Solid-State Devices: Nonlinear Capacitors, Definitions of Terms for (AIEE/IRE JS-8), (61 IRE 28 S1)
255	Semiconductor Devices, Letter Symbols for (Dec. 1963)
256	Semiconductor Diodes, Test Procedure for (Dec. 1963)

*In ANSI List

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257	Burst Measurements in the Time Domain, Technical Committee Report on Recommended Practices for (May 1964)
265	Burst Measurements in the Frequency Domain, Technical Report on Recommended Practices for (Feb. 1966)
266	Insulation Systems for Electronics Power Transformers, Test Procedure for Evaluation of (Mar. 1969)
270	General (Fundamental and Derived) Electrical and Electronics Terms, Definitions of (Sept. 1966)
274	Integrated Electronics, Definitions of Terms for (Dec. 1966)
276	Electronics Transformers, Letter and Graphic Symbols for (Jan. 1967)
295	Electronics Power Transformers (June 1969)
297	Speech Quality Measurements, Recommended Practice for (June 1969)

MIL SPECS and STANDARDS

MIL-STD-104A	Limit for Electrical Insulation Color, 12 Jul 63
MIL-STD-417	Rubber Compositions, Vulcanized General Purpose, Solid (Symbols and Tests), 1 Jan 62
MIL-STD-670B	Classifications Systems and Tests for Cellular Elastomeric Materials,30 Jan 68
MIL-STD-681B	Identification Coding and Application of Hookup and Lead Wire, 14 Jun 65
MIL-M-14F(5)	Molding Plastics and Molded Plastic Parts, Thermosetting, 14 Sept 64
MIL-P-79C(2)	Plastic Rod and Tube, Thermosetting Laminated, 10 Sept 64
MIL-C-572F	Cord, Yarns and Monofilaments, Organic Synthetic Fiber, 10 Jun 1969
MIL-I-631D(3)	Insulation, Electrical, Synthetic-resin Composition, Nonrigid, 20 Jun 68
MIL-T-713	Twine, Impregnated, Lacing and Tying, 27 March 68
MIL-P-997C	Plastic Material Laminated, Thermosetting, Electric Insulation, Sheets, Glass, Cloth Silicone Resin, 14 June 68
MIL-I-3190B(1)	Insulation Sleeving, Electrical, Flexible Treated, 7 Jun 63
MIL-S-4174B	Steel Sheet and Strip, Flat, Aluminum Coated, Low Carbon,9 Feb 68
MIL-A-5092B(2)	Adhesive, Rubber Base, General Purpose, 6 Jul 65
MIL-B-5687C	Bearings, Sleeve, Washers, Thrust, Sintered, Metal Powder, Oil-Impregnated, 12 Jun 62
MIL-S-6758A	Steel Chrome-Molybdenum (4130) Bars and Reforging Stock (Aircraft Quality), 14 Jun 50
MIL-T-6841C(1)	Tape and Sheet, Adhesive, Rubber and Cork Composition, 5 Sept 68
MIL-I-7444C(1)	Insulation Sleeving, Electrical Flexible, 1 Oct 68
MIL-I-7798A(2)	Insulation Tape Electrical, Pressure Sensitive Adhesive, Plastic, 25 Sept 58
MIL-T-8506A	Tubing Steel (Corrosion-Resistant)(304), Annealed, Seamless and Welded, 14 Dec 66
MIL-T-8606B	Tubing Steel Corrosion-Resistant (18-8 Stabilized), 22 May 67
MIL-P-1916A(1) MIL-P-13949D(3)	Plastic Sheet, Laminated, Copper Clad (For Printed Wiring), 20 Jan 69
MIL-P-15035C(3)	Plastic Sheet, Laminated, Thermosetting Cotton Fabric Base, Phenolic-Resin, 23 Mar 67
MIL-P-15037E(1)	Plastic Sheet Laminated, Thermosetting Glass-cloth, Melamine-resin, 1 Nov 65
MIL-I-15126F, Type Act	Insulation Tape, Electrical, Pressure Sensitive Adhesive and Pressure Sensitive Thermosetting Adhesive, 15 Jan 64
MIL-B-15395A(2)	Brazing Alloy Silver, 5 May 67
MIL-W-16878D	Wire Electrical, Insulated High Temperature (Navy) 15 June 67
MIL-I-16923E	Insulating Compound, Electrical Embedding, 17 Jul 67
MIL-I-18057A(1)	Insulation Sleeving, Electrical, Flexible, Glass Fiber Silicone Rubber Treated, 10 Mar 61
MIL-P-18177C(1)	Plastic Sheet, Laminated, Thermosetting, Glass Fiber Base, Epoxy-resin, 15 Dec 61
MIL-P-19468A	Plastic Rods, Polytetrafluorethylene, Molded and Extruded, 20 Jan 60
MIL-M-19833B(1)	Plastic Molding Material and Plastic Molded Parts, Glass Fiber-filled Diallyl Ph thalate Resin, 30 Dec 65
MIL-M-20693A(5)	Molding Plastic, Polyamide (Nylon) Rigid, 21 Dec 66
MIL-M-21557B	Insulation Sleeving, Electrical, Flexible, Glass Fiber, Vinyl Treated, 19 Jul 63
MIL-I-22129C(1)	Insulation Tubing, Electrical, Polytetrafluorethylene Resin, Nonrigid, 18 Feb 65

MIL Specs & Stds (Cont.)

MIL-P-22269A	Plastic Tubes and Tubing, Polytetrafluorethylene, (Tfefluoro-Carbon Resin), Heavy walled, 6 Jun 67
MIL-P-22324A	Plastic Sheet Laminated, thermosetting, paper-base, epoxy-resin, 3 Apr 62
MIL-I-23053B(1)	Insulation Sleeving, Electrical, Heat Shrinkable, General Specification for, 18 Feb 69
MIL-R-46089(1)	Rubber Sponge, Silicone, Closed Cell, 31 Aug 64
MIL-P-46112(1)	Plastic Sheet and Strip, Polymide, 7 Jun 68

Aerospace Material Specifications

3301D	Silicone Rubber - General Purpose, 35-45 (MIL-R-5847)
3302D	Silicone Rubber - General Purpose, 45-55 (MIL-R-5847)
3303F	Silicone Rubber - General Purpose, 55-65 (MIL-R-5847)
3304D	Silicone Rubber - General Purpose, 65-75 (MIL-R-5847)
3305E	Silicone Rubber - General Purpose, 75-85 (MIL-R-5847)
4018B	Sheet and Plate - 3.5 Mg 0.25 Cr 5154-0
4019	Sheet and Plate - 3.5 Mg 0.25 Cr 5154-H32 (MIL-A-17357)
5632C	Bars and Forgings - 17 Cr 0.5 Mo 51440F

Department of Commerce Commercial Standards

CS239-61	TFE-Fluorocarbon (Polytetrafluoroethylene)Resin Sheet
CS252-63	TFE-fluorocarbon (Polytetrafluoroethylene) Resin Electrical Tubing
CS257-63	TFE-Fluorocarbon (Polytetrafluoroethylene) Resin Molded Basic Shapes

NEMA

Publication LI 1-1965 Industrial Laminated thermosetting products
Publication MW-1000-1967 (ANSI C9.100-1968) Magnet Wire

Federal Specifications

L-P-387a(1)	Plastic Sheet, Laminated, thermosetting (for designation plates), Jun 4 68
L-P-389a(1)	Plastic molding material, FEP fluorocarbon, molding and extrusion, Feb 11 65
L-P-393a(1)	Plastic molding material, polycarbonate, injection & extrusion, Feb 11 65
L-P-394b	Plastic molding material, (propylene plastics), injection & extrusion, Jun 24 68
L-P-410a(1)	Plastic, polyamid (nylon), rigid: rods, tubes, flats, molded & cast part, Oct 30 67
L-P-513C	Plastic sheet and insulation sheet, electrical (laminated), thermosetting, paper-base, phenolic-resin, Dec 19 68
L-P-516a	Plastic sheet & plastic rod, thermosetting, cast, Mar 21 67
L-P-523a	Plastic sheet & film, FEP-fluorocarbon, extruded, Oct 14 65
L-P-1183(1)	Plastic molding material, acrylonitrile-butadiene-styrene (ABS), rigid, Jan 16 68
QQ-A-200c	Aluminum alloy, bar, rod, shapes, tube, and wire, extruded, & structural, Mar 8, 67
QQ-A-225/9c	Aluminum alloy bar, rod, wire, & special shapes; rolled, drawn, or cold finished, 7075, Mar 15 67
QQ-A-250/12d	Aluminum alloy 7075, plate & sheet, Mar 17 67
QQ-A-250/13d	Aluminum alloy alclad 7075, plate & sheet, Mar 17 67
QQ-A-601D(1)	Aluminum alloy sand castings, Jul 14 69
QQ-C-585a	Copper-nickel-zinc alloy plate, sheet, strip, & bar (copper alloy numbers 735, 745, 752, 762, 766, & 770) Dec 31 63
QQ-M-56b(1)	Magnesium alloy, sand castings, Dec 19 63
QQ-R-175a	Resistance wire, Dec 10 64
QQ-R-566a	Rods, welding, aluminum & aluminum alloys, Mar 10 64
QQ-S-561d(Int. Amd. 1)	Solder; silver, May 5 67
QQ-S-571d	Solder; tin alloy; lead-tin alloy; & lead alloy Jul 10 63
QQ-S-637	Steel bar, carbon, cold finished (standard quality, free machining) Feb 17 65
QQ-S-764a	Steel bar, corrosion resisting, free machining, Jan 3 66

Federal Specifications (cont.)

QQ-S-766c(5)	Steel Plates, sheets, & strip-corrosion resisting, Dec 15 66
QQ-W-343b	Wire, electrical (uninsulated), Jun 13 66
QQ-W-423b	Wire, steel, corrosion-resisting, May 26 69
WW-T-700 6d(i)	Tube, aluminum Alloy, Drawn, Seamless 6061, Oct 5 67

Federal Test Method

Standard #601	Rubber: Sampling & Testing, Nov 26 62

ASTM Standards

*A 36-69	Structural Steel, Spec. for
A108-69	Cold-Finished Carbon Steel Bars and Shafting, Spec. for
A167-63	Corrosion-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip, Spec. for
A176-83	Corrosion-Resisting Chromium Steel Plate, Sheet, and Strip, Spec. for
A269-69	Seamless and Welded Austenitic Stainless Steel Tubing for General Service, Spec. for
A276-67	Stainless and Heat-Resisting Steel Bars and Shapes, Spec. for
A313-67	Chromium-Nickel Stainless and Heat-Resisting Steel Spring Wire, Spec. for
*A331-64a	Cold-Finished Alloy Steel Bars, Spec. for
*A505-64	General Requirements for Hot-rolled and Cold-rolled Alloy Steel Sheet and Strip, Spec. for
*B3-63	Soft or Annealed Copper Wire, Spec. for
B26-68	Aluminum Alloy Sand Castings, Spec. for
B32-66T	Solder Metal, Spec. for
*B33-63	Tinned Soft or Annealed Copper Wire for Electrical Purposes, Spec. for
*B48-68	Soft Rectangular and Square Bare Copper Wire for Electrical Conductors, Spec. for
*B70-56 (1965)	Change of Resistance with Temperature of Metallic Materials for Electrical Heating, Test for
B80-69	Magnesium Alloy Sand Castings, Spec. for
B122-66	Copper-Nickel-Zinc Alloy (Nickel Silver) and Copper-Nickel Alloy Plate, Sheet, Strip, and Rolled Bar, Spec. for
*B153-58 (1965)	Expansion (Pin Test) of Copper and Copper Alloy Tubing, Test for
*B174-64	Bunch-Stranded Copper Conductors for Electrical Conductors, Spec. for
*B209-69	Aluminum-Alloy Sheet and Plate, Spec. for
*B210-68	Aluminum-Alloy Drawn Seamless Tubes, Spec. for
*B211-69	Aluminum-Alloy Bars, Rods, and Wire, Spec. for
*B221-69	Aluminum-Alloy Extruded Bars, Rods, Shapes, and Tubes, Spec. for
*B241-69	Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube, Spec. for
B260-62T	Brazing Filler Metal, Spec. for
B284-60T	Rosin Hux cored solder, Spec. for
*B288-65T	Copper Conductors for Use in Hookup Wire for Electronic Equipment, Spec. for
*B298-64	Silver-Coated Soft or Annealed Copper Wire, Spec. for
*B303-67	Copper-Infiltrated Sintered Carbon Steel Structural Parts, Spec. for
*B344-65	Drawn or Rolled Nickel-Chromium and Nickel-Chromium-Iron Alloys for Electrical Heating Elements, Spec. for
*B438-67	Copper-Base Sintered Metal Powder Bearings (Oil Impregnated), Spec. for
B470-68	Bonded Copper Conductors for Use in Hookup Wire for Electronic Equipment, Spec. for
*D119-67	Rubber Insulating Tape, Spec. for
D150-68	A-C Loss Characteristics and Dielectric Constant (Permittivity) of Solid Electrical Insulating Materials, Tests for
*D229-69	Rigid Sheet and Plate Materials Used for Electrical Insulation, Testing
*D257-66	D-C Resistance or Conductance of Insulating Materials, Tests for
D372-68	Flexible Treated Sleeving Used for Electrical Insulation, Spec. for
D374-68	Thickness of Solid Electrical Insulation, Tests for
*D412-68	Tension Testing of Vulcanized Rubber
*D542-50 (1965)	Index of Refraction of Transparent Organic Plastics, Tests for
*D570-63	Water Absorption of Plastics, Test for

*This has been adopted as an ANSI Standard

ASTM Standards (Cont.)

*D579-66		Woven Glass Fabrics, Spec. and Tests for
*D618-61		Conditioning Plastics and Electrical Insulating Materials for Testing
*D621-64		Deformation of Plastics Under Load, Tests for
*D635-68		Flammability of Self-Supporting Plastics, Tests for
D638-68		Tensile Properties of Plastics, Test for
D648-56	(1961)	Deflection Temperature of Plastics Under Load, Test for
D696-44	(1961)	Coefficient of Linear Thermal Expansion of Plastics, Test for
*D709-67		Laminated Thermosetting Materials, Spec. for
*D754-58	(1965)	Synthetic Rubber Insulation for Wire and Cable, 75 C Operation, Spec. for
*D792-66		Specific Gravity and Density of Plastics by Displacement, Tests for
D797-64		Young's Modulus in Flexure of Natural and Synthetic Elastomers at Normal and Subnormal Temperatures, Test for
D876-65		Nonrigid Vinyl Chloride Polymer Tubing, Testing
D882-67		Tensile Properties of Thin Plastic Sheeting, Tests for
D922-65		Nonrigid Vinyl Chloride Polymer Tubing, Spec. for
D1000-68		Pressure-Sensitive Adhesive Coated Tapes Used for Electrical Insulation, Testing
D1002-64		Strength Properties of Adhesives in Shear by Tension Loading (Metal-to-Metal), Test for
D1056-68		Sponge and Expanded Cellular Rubber Products, Spec. and Tests for
*D1248-69		Polyethylene Plastics Molding and Extrusion Materials, Spec. for
D1457-69		TFE-fluorocarbon Resin Molding and Extrusion Materials, Spec. for
*D1531-62		Dielectric Constant and Dissipation Factor of Polyethylene by Liquid Displacement Procedure, Test for
D1710-66		TFE-Fluorocarbon Rod, Spec. for
D1788-68		Rigid Acrylonitrile-Butadiene-Styrene (ABS) Plastics, Spec. for
D1867-68		Copper-Clad Thermosetting Laminates for Printed Wiring, Spec. for
E8-68		Tension Testing of Metallic Materials
*E18-67		Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials, Tests for

*This has been adopted as an ANSI Standard.

Appendix E — International Standards Membership

ISO Memento, 1970 — ISO Secretariats

Country	Committees	Subcommittees	Total
United Kingdom	31	39	70
France	24	42	66
Germany	10	21	31
U.S.A.	14	16	30
Switzerland	5	10	15
Belgium	7	7	14
U.S.S.R.	5	9	14
Netherlands	6	6	12
Italy	3	7	10
Sweden	6	3	9
India	4	3	7
Poland	1	5	6
Australia	1	2	3
Austria	2	1	3
Denmark	1	2	3
Portugal	3	0	3
Romania	2	1	3
Hungary	1	1	2
Iran	1	1	2
Japan	1	1	2
Czechoslovakia	1	0	1
Finland	0	1	1
Israel	0	1	1
South Africa	1	0	1

IEC Handbook, 1970 — IEC Secretariats

United Kingdom	7	20	27
France	11	14	25
Netherlands	8	15	23
U.S.A.	8	13	21
Germany	7	12	19
Italy	5	3	8
Sweden	2	5	7
Belgium	3	3	6
Hungary	2	4	6
Switzerland	4	2	6
U.S.S.R.	3	2	5
Canada	2	0	2
Denmark	0	2	2
Czechoslovakia	1	0	1
India	1	0	1
Japan	0	1	1
Poland	1	0	1

IEC Committee Meetings Attended by NBS Staff

No.	Title	Name	1965	1966	1967	1968	1969	1970
3	Graphical Symbols	Shapiro	1					
13	Measuring Instruments	Domsitz		1		1	1	
		Turgel				1		
24	Electric & Magnetic Quantities & Units	Page						2*
		Cutkosky						1*
25	Letter Symbols & Signs	Page		1	3	2	2	1*
		Mason			1			
		Cutkosky						1*
29	Electro-Acoustics	Koidan				2	1	
		Domsitz		1				
45	Electrical Measuring Instrumentation - Ionizing Radiation	Costrell	1		1	2	1	
46	Cables, Wires, Waveguides - Telecommunication Equipment	Shapiro	1		2	1	1	1
		Klein					1	
		Deschamps			1			
		Anderson	1					
51	Magnetic Materials & Components	Dalke	1		2	1	2	
56	Reliability of Electronic Components & Equipment	Kit				1		
58	Methods of Measurement of Electrical properties of Metallic Materials	Franklin					1	
61	Safety of Household Appliances	Shupe						1
66	Electronic Measuring Equipment	Domsitz					1	1
General Meeting		Bates					1	
		Turgel					1	
		Shapiro					1	
		Podolsky			1			
		Gordon			1			
		Domsitz					1	

* IEC/TC 24 and 25 met in Consecutive Meetings

ISO Committee Meetings Attended by NBS Staff

No.	Title	Name	1965	1966	1967	1968	1969	1970
1	Screw Threads	Strang	1		2	1		
		Fulmer	1					
6	Paper	Hobbs		1	1			
		Wilson	1		1		1	
12	Quantities, Symbols Conversion Factors and Conversion Tables	Gordon		1				
		Strang			1			
17	Steel	Tate		1	1		1	
		Meyerson			1			
		Bennet	1					
		Schultz						1
		Geil						1
24	Sieves	Kirby	1	1		1		
26	Copper	Wyman	1	1				
28	Petroleum Products	Wollin						1
30	Measurement of Fluid Flow in Closed Conduits	Ruegg					1	
36	Cinematography	McCamy	1	1	1			
38	Textiles	Horowitz	1					
39	Machine Tools	Brown	1		1	2		
42	Photography	McCamy		1	1			
43	Acoustics	Cook		1				
		Koidan				1		
45	Rubber	Stiehler	1	1	1	1	1	1
57	Surface Finish	Strang			1			
59	Building Construction	Smith					1	
61	Plastics	Kline	1	1	1			1
		Horowitz		1	1	1		
72	Textile Machinery and Accessories	Brener		1				
74	Hydraulic Binders	Dise		1				
85	Nuclear Energy	Goldman					1	1
86	Refrigeration	Achenbach	1			2		
92	Fire Tests on Building Materials and Structures	Robertson		1		1	1	1
		Benjamin						1
94	Personal Safety	Armstrong	1			2		
95	Office Machines	Harrison				1	2	1
		Heiser					1	

ISO Committee Meetings Attended by NBS Staff (Cont.)

No.	Title	Name	1965	1966	1967	1968	1969	1970
97	Computers and Information Processing	Mantek			1		1	1
		Griffin			1	1		
		Alexander		1				
		Ream		1				
		Grosch				1		1
		Duncan					1	
		Johnson					1	
		Walkowicz						1
		White						2
106	Dentistry	Sweeney		1	2	1		
108	Mechanical Vibration & Shock	Ramboz						1
112	Vacuum Technology	Johnson	1		1	1		
125	Enclosures and Conditions for Testing	Stiehler				1		
ISO Council		Schon	1					

Published Standards - IEC Committees

Committee No.	Title	1964	1965	1966	1967	1968	1969	1970*	Total
1	Terminology	1	1	1	-	2	1	2	8
2	Rotating Machinery	-	1	-	4	3	3	1	12
3	Graphical Symbols	3	-	5	3	4	3		18
4	Hydraulic Turbines	1	1	1	-	-	1		4
5	Steam Turbines	-	1	-	-	-	-		1
7	Bare Aluminium Conductors	-	-	4	-	-	-		4
8	Standard Voltages, Current Ratings & Frequencies	-	1	-	2	-	-		3
9	Electric Traction Equipment	-	-	-	1	1	2		4
10	Liquid & Gaseous Dielectrics	2	-	-	-	-	1		3
12	Radio-Communication	1	1	1	2	3	5	1	14
13	Measuring Instruments	1	-	1	2	3	-		7
14	Power Transformers	-	-	1	1	1	-		3
15	Insulating Materials	1	-	3	2	-	2		8
16	Terminal Markings & Other Identifications	-	-	-	-	-	-		-
17	Switchgear & Controlgear	2	1	1	-	4	5		13
18	Electrical Installations in Ships	1	5	-	-	-	2	1	9
20	Electric Cables	1	4	2	8	-	3	1	19
21	Accumulators	-	2	-	1	-	1		4
22	Static Power Convertors	1	-	1	2	-	-		4
23	Electrical Accessories	-	-	-	1	1	1	1	4
24	Electric & Magnetic Quantities & Units	1	-	1	-	-	-		2
25	Letter Symbols & Signs	-	-	1	-	-	-		1
26	Electric Welding	-	-	-	-	-	-		-
27	Electro-Heating	-	-	-	2	-	-		2
28	Insulation Coordination	1	-	-	1	-	-		2
29	Electro-Acoustics	3	4	5	1	2	1	5	21
30	Extra-High Voltages	-	-	-	-	-	-		-
31	Electrical Apparatus for Explosive Atmospheres	-	-	1	1	1	3	1	7
32	Fuses	-	-	-	-	3	2		5
33	Power Capacitors	-	-	-	2	1	1		4
34	Lamps & Related Equipment	1	6	2	2	2	4		19
35	Primary Cells & Batteries	-	3	-	1	-	-		4
36	Insulators	1	-	1	1	2	1		6
37	Lightning Arresters	-	1	-	-	-	-	1	2
38	Instrument Transformers	-	-	1	-	-	1		2
39	Electronic Tubes & Valves	8	2	7	4	4	9		34
40	Capacitors & Resistors for Electronic Equipment	3	6	1	3	4	6	2	25
41	Electrical Relays	-	-	-	1	-	1		2
42	High-Voltage Testing Techniques	-	-	-	1	1	-		2
43	Electric Fans	-	1	2	-	-	1		4
44	Electrical Equipment of Machine-Tools	-	1	-	2	1	1		5
45	Nuclear Instrumentation	1	2	1	5	1	7		17
46	Cables, Wires & Waveguides for Telecommunication Equipment	7	7	3	6	7	7	2	39
47	Semiconductor Devices & Integrated Circuits	-	-	3	1	-	8	3	15

*Being Printed in 1970

Published Standards - IEC Committees (Cont.)

Committee No.	Title	1964	1965	1966	1967	1968	1969	1970*	Total
48	Electromechanical Components for Electronic Equipment	2	5	5	-	3	7	3	25
49	Piezo-Electric Crystals & Associated Devices	-	-	-	1	1	4		6
50	Environmental Testing	3	2	4	4	9	7		29
51	Magnetic Materials & Components	-	1	6	2	3	2	1	15
52	Printed Circuits	-	1	-	1	2	2	2	8
54	Household Appliances for Refrigeration & Air-Conditioning	-	-	-	-	1	2		3
55	Winding Wires	2	-	-	-	2	-	6	10
56	Reliability of Electronic Components and Equipment	-	-	-	-	2	2		4
57	Power Line Carrier Systems	-	-	-	-	-	-		-
58	Methods of Measurement of Electrical Properties of Metallic Materials	-	-	-	-	-	-		-
59	Performance of Household Electrical Appliances	-	-	-	-	-	3		3
60	Recording	-	-	-	-	1	-		1
61	Safety of Household Electrical Appliances	-	-	-	-	-	-		-
62	Electrical Equipment in Medical Practice	-	-	-	-	-	-		-
63	Insulation Systems	-	-	-	-	-	-		-
64	Electrical Installations of Buildings	-	-	-	-	-	-		-
65	Process Control Systems	-	-	-	-	-	-		-
66	Electronic Measuring Equipment	-	-	-	-	-	-		-
67	Analogue Computing Equipment	-	-	-	-	-	-		-
68	Magnetic Alloys & Steel	-	-	-	-	-	-		-
69	Electric Road Vehicles	-	-	-	-	-	-		-
	International Special Committee on Radio Interference (CISPR)	1	-	5	4	-	-		10

*Being Printed in 1970

Published Recommendations (R) - ISO Committees *

ISO Committee No.	Title	# (R) Published	Date of last (R) if over 3 years	United States Participation	Observer only - 0
1	Screw threads	7		X	
2	Bolts, nuts and accessories	10		X	
3	Limits and fits	5			0
4	Roller Bearings	22		X	
5	Pipes and fittings	25		X	
6	Paper, board and pulps	38		X	
7	Rivets	1			0
8	Shipbuilding details	33			0
10	Drawings (general principles)	4		X	
11	Boilers and pressure vessels	1		Secretariat	
12	Quantities, units... conversion tables	2		X	
13	Shaft heights of machinery	1	1966		0
14	Shaft ends	1			0
15	Couplings	--			0
16	Keys and keyways	2			0
17	Steel	57		X	
18	Zinc and zinc alloys	8		X	
19	Preferred numbers	3	1966	X	
20	Aircraft and space vehicles	50		X	
21	Fire-fighting equipment	--			0
22	Automobiles	7		X	
22T	Agricultural tractors	3		X	
23	Agricultural machines	1	1967	X	
24	Sieves, sieving... sizing methods	1	1967	X	
25	Cast iron	8		X	
26	Copper and copper alloys	16	1965	X	
27	Solid mineral fuels	43		X	
28	Petroleum products	1	1959	Secretariat	
29	Small tools	27		X	
30	Measurement of fluid...conduits	2		X	
31	Tires, rims and valves	--		Secretariat	
32	Splines and serrations	2	1961	X	
33	Refractories	6		X	
34	Agricultural food products	56			0
35	Paints, varnishes	13		X	
36	Cinematography	29		Secretariat	
37	Terminology (Principles & coordination)	6		X	
38	Textiles	20		X	
39	Machine tools	13		X	
40	---				
41	Pulleys...(incl. vee-belts)	28		X	
42	Photography	26		Secretariat	
43	Acoustics	14		X	
44	Welding	31		X	
45	Rubber	35		X	

*As of August 1970

Published Recommendations (R) - ISO Committee (Cont.)

No.	Title	# (R) Published	Date of last (R) if over 3 years	United States Participation	Observer only - 0
46	Documentation	27		X	
47	Chemistry	71		X	
48	Laboratory glassware...apparatus	21		X	
49	---	--			
50	Lac	4	1966	X	
51	Pallets for unit load...handling	4		X	
52	Hermetically sealed...containers	1			0
53	---	--			
54	Essential oils	15			0
55	Sawn timber	6			0
56	Mica	2	1965	X	
57	Surface finish	1	1966	X	
58	Gas cylinders	3	1966	X	
59	Building construction	4		X	
60	Gears	7			0
61	Plastics	69		Secretariat	
62	Sheet and wire gauges...thicknesses	1	1964	X	
63	Screw threads...containers & closures	1			0
64	Methods of testing fuel-using equipment	1			0
65	Manganese ores	24	1967		0
66	Determination of viscosity	--		Secretariat	
67	Materials and equipment...industries	--		X	
68	Standardization...banking	--			0
69	Applications of statistical methods	1	1967	X	
70	Internal combustion engines	--			0
71	Concrete and reinforced concrete	--		X	
72	Textile machinery and accessories	48			0
73	Consumer questions	3	1966	X	
74	Hydraulic binders	6		X	
75	Stretchers and stretcher carriers	1	1960	X	
76	Transfusion equipment for medical use	1		X	
77	Products in asbestos cement	10		X	
78	Aromatic hydrocarbons	--		X	
79	Light metals and their alloys	37		X	
80	Safety color	2	1967	X	
81	Common names for pesticides	17		X	
82	Mining	6		X	
83	Gymnastics and sports equipment	5	1964		0
84	Syringes for medical...injections	3	1967	X	
85	Nuclear energy	2		Secretariat	
86	Refrigeration	7		X	
87	Cork	1	1967		0
88	Pictorial markings...goods	2			0
89	Boards made from wood...materials	13			0
90	---				

Published Recommendations (R) - ISO Committee (Cont.)

No.	Title	# (R) Published	Date of last (R) if over 3 years	United States Participation	Observer only - 0
91	Surface active agents	22		X	
92	Fire tests on building...structures	1		X	
93	Starch (including derivatives & by-products)	--		X	
94	Personal safety...clothing	--		X	
95	Office machines	5		X	
96	Cranes, lifting appliances...equipment	--		X	
97	Computers and information processing	17		Secretariat	
98	Bases for design of structures	--			0
99	Semimanufactures of timber	2			0
100	Chains and chain wheels...conveyors	2	1967	X	
101	Continuous mechanical...equipment	2			0
102	Iron ores	--		X	
103	---				
104	Freight containers	3		Secretariat	
105	Steel wire ropes	--			0
106	Dentistry	--		X	
107	Metallic and other non-organic coatings	--		X	
108	Mechanical vibration and shock	--		Secretariat	
109	Oil burners and... equipment	--			0
110	Industrial trucks	4		X	
111	Round steel link chains...accessories	--		X	
112	Vacuum technology	--		X	
113	Measurement of liquid flow...channels	6		X	
114	Horology	2			0
115	Pumps	--			0
116	Space heating appliances	--			0
117	Industrial fans	--		X	
118	Displacement and turbo compressors	--			0
119	Powder metallurgical...products	--		X	
120	Leather	--		X	
121	Anesthetic equipment...machines	--		X	
122	Packaging	--		Secretariat	
123	Plain bearings	--		X	
124	Industrial process control instruments	--		X	
125	Enclosures and conditions for testing	2	1967		0
126	Tobacco and tobacco products	--		X	
127	Earth moving machinery	--		Secretariat	
128	Glass Pipeline/Fittings	--			0
129	Aluminum ores	--		X	
130	Graphic Technology	--		X	
131	Fluid Power Systems/Components	--		Secretariat	
132	Ferroalloys	--		X	
133	Sizing of clothes	--		X	
134	Fertilizer and soil improvers	--		X	
135	Nondestructive testing	--		X	
136	Furniture	--		X	

Appendix F

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