

1025-A

9214
Sci 2
92-2/14

Y 4 AUTHORIZATION FOR FIRE RESEARCH AND SAFETY
.Sci 2 AND THE STANDARD REFERENCE DATA ACTS
92-2/14 (H.R. 13034)

GOVERNMENT DOCUMENTS
Storage
APR 17 1972

THE LIBRARY
KANSAS STATE UNIVERSITY

HEARING
BEFORE THE
SUBCOMMITTEE ON
SCIENCE, RESEARCH, AND DEVELOPMENT
OF THE
COMMITTEE ON
SCIENCE AND ASTRONAUTICS
U.S. HOUSE OF REPRESENTATIVES
NINETY-SECOND CONGRESS
SECOND SESSION
FEBRUARY 17, 1972
[No. 14]

Printed for the use of the
Committee on Science and Astronautics



AY
S 102.
A1/2-50

DOC

COMMITTEE ON SCIENCE AND ASTRONAUTICS

GEORGE P. MILLER, California, *Chairman*

OLIN E. TEAGUE, Texas
KEN HECHLER, West Virginia
JOHN W. DAVIS, Georgia
THOMAS N. DOWNING, Virginia
DON FUQUA, Florida
EARLE CABELL, Texas
JAMES W. SYMINGTON, Missouri
RICHARD T. HANNA, California
WALTER FLOWERS, Alabama
ROBERT A. ROE, New Jersey
JOHN F. SEIBERLING, Jr., Ohio
WILLIAM R. COTTER, Connecticut
CHARLES B. RANGEL, New York
MORGAN F. MURPHY, Illinois
MIKE McCORMACK, Washington
MENDEL J. DAVIS, South Carolina
BOB BERGLAND, Minnesota

CHARLES A. MOSHER, Ohio
ALPHONZO BELL, California
THOMAS M. PELL, Washington
JOHN W. WYDLER, New York
LARRY WINN, Jr., Kansas
ROBERT PRICE, Texas
LOUIS FREY, Jr., Florida
BARRY M. GOLDWATER, Jr., California
MARVIN L. ESCH, Michigan
R. LAWRENCE COUGHLIN, Pennsylvania
JOHN N. HAPPY CAMP, Oklahoma

CHARLES F. DUCANDER, *Executive Director and Chief Counsel*

JOHN A. CARSTARPHEN, Jr., *Chief Clerk and Counsel*

PHILIP B. YEAGER, *Counsel*

FRANK R. HAMMILL, Jr., *Counsel*

W. H. BOONE, *Technical Consultant*

JAMES E. WILSON, *Technical Consultant*

RICHARD P. HINES, *Staff Consultant*

HAROLD A. GOULD, *Technical Consultant*

J. THOMAS RATCHFORD, *Science Consultant*

PHILIP P. DICKINSON, *Technical Consultant*

WILLIAM G. WELLS, Jr., *Technical Consultant*

JOHN D. HOLMFELD, *Science Policy Consultant*

CARL SWARTZ, *Minority Staff*

JOSEPH DEL RIEGO, *Minority Staff*

ELIZABETH S. KERNAN, *Scientific Research Assistant*

FRANK J. GIROUX, *Clerk*

DENIS C. QUIGLEY, *Publications Clerk*

A. PATRICK NUCCIARONE, *Assistant Publications Clerk*

SUBCOMMITTEE ON SCIENCE, RESEARCH, AND DEVELOPMENT

JOHN W. DAVIS, Georgia, *Chairman*

EARLE CABELL, Texas
JAMES W. SYMINGTON, Missouri
RICHARD T. HANNA, California
JOHN F. SEIBERLING, Jr., Ohio
MIKE McCORMACK, Washington

ALPHONZO BELL, California
MARVIN L. ESCH, Michigan
R. LAWRENCE COUGHLIN, Pennsylvania

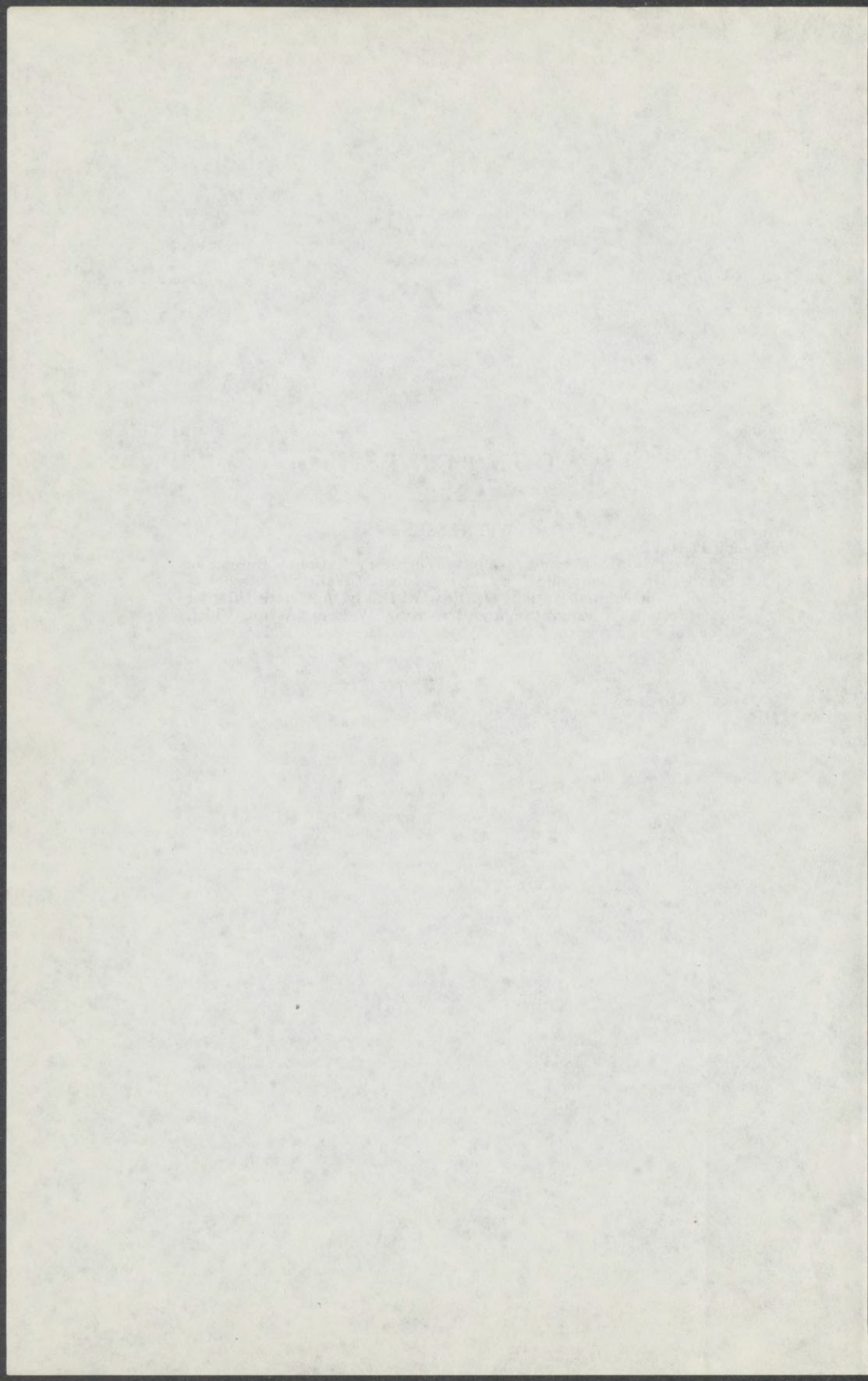
CONTENTS

WITNESSES

February 17, 1972:

Dr. Lawrence M. Kushner, Deputy Director, National Bureau of Standards; accompanied by: Mr. Robert Walleigh, Associate Director for Administration, Dr. Edward Brady, Associate Director for Information Programs, and Dr. King Walters, Acting Chief, Office of Fire Programs-----

Page
1



**AUTHORIZATION FOR FIRE RESEARCH AND SAFETY
AND THE STANDARD REFERENCE DATA ACTS (H.R.
13034)**

THURSDAY, FEBRUARY 17, 1972

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE AND ASTRONAUTICS,
SUBCOMMITTEE ON SCIENCE, RESEARCH, AND DEVELOPMENT,
Washington, D.C.

The subcommittee met at 10 a.m. in room B-374 Rayburn House Office Building, the Honorable John W. Davis (chairman of the subcommittee), Mr. Hanna presiding.

Mr. HANNA. Gentlemen: Will the subcommittee come to order.

This morning we meet to consider the authorization request for funds to continue research programs under the Fire Research and Safety and the Standard Reference Data Acts. We will also take testimony on amendments to the basic act of the Bureau of Standards.

I will be pleased to hear of progress from the fire research program that the Bureau of Standards is carrying out. The importance of contributions to the reductions in loss of life and fire damage is obvious to all of us. We believe that this program has and will continue to give us a greater understanding of combustion processes and fire propagation and will provide the firefighting community with valuable technical advances to reduce the national loss.

We will also note your contributions to the widespread dissemination of reliable standard reference data. I am sure that the importance of these data grows daily as our technology becomes more complex and the need for more rapid application of new technology is required to maintain our worldwide competitive position.

And last we want to hear your views on the amendments that are contained in the bill that are designed to improve your operations.

We are happy to welcome you and your colleagues, Dr. Kushner. You may proceed with your testimony.

**STATEMENT OF LAWRENCE M. KUSHNER, DEPUTY DIRECTOR OF
THE NATIONAL BUREAU OF STANDARDS, ACCOMPANIED BY
ROBERT WALLEIGH, ASSOCIATE DIRECTOR FOR ADMINISTRATION;
DR. EDWARD BRADY, ASSOCIATE DIRECTOR FOR INFORMATION
PROGRAMS; AND DR. KING WALTERS, ACTING CHIEF,
OFFICE OF FIRE PROGRAMS**

Dr. KUSHNER. Mr. Chairman, I am delighted for the opportunity to appear today.

I would like to introduce several of my colleagues from the National Bureau of Standards who are prepared to supplement my testimony.

On my right, Dr. King Walters, who is the Acting Chief of our Office of Fire Programs; Dr. Edward Brady, our Associate Director for Information Programs, and on my left, Mr. Robert Walleigh, our Associate Director for Administration.

Mr. HANNA. Glad to have all of you gentlemen.

Dr. KUSHNER. Mr. Chairman.

I am pleased to appear before you today in support of H.R. 13034, which would make certain minor changes in the Organic Act of the National Bureau of Standards, and would authorize appropriations for two important NBS programs—the National Standard Reference Data System and the Fire Research and Safety Program.

On August 3, 1971, Dr. Lewis M. Branscomb, Director of the National Bureau of Standards, Dr. Edward L. Brady, Associate Director for Information Programs, and Dr. F. Karl Willenbrock, Director of our Institute for Applied Technology, described the National Standard Reference Data System and our Fire Research and Safety activities in considerable detail while appearing before this subcommittee in support of H.R. 7188 and H.R. 7189. For this reason, I shall limit my remarks concerning these programs to just a brief review of recent activities and changes that have occurred in our plans for fiscal year 1973 and beyond.

NATIONAL STANDARD REFERENCE DATA SYSTEM

The National Standard Reference Data System (NSRDS) is a nationwide program to give the technical community of the United States optimum access to the quantitative data of physical science, critically evaluated and compiled for convenience. The principal focus of the program as carried out under the authority of the Standard Reference Data Act, is on reliable quantitative information about the physical and chemical properties of well-defined substances. It seeks to upgrade the quality of experimental work throughout science and technology in the United States by publishing evaluations and criteria for carrying out and reporting laboratory measurements. It attempts to increase the productivity of American science and technology by insuring the ready availability of reliable data.

At the time of the hearing last August, we had just concluded an agreement with the American Institute of Physics and the American Chemical Society under which a new publication mechanism for the output of the program was to be established. The plans for the new Journal of Physical and Chemical Reference Data have proceeded rapidly. The first issue is now being printed and should be available by the end of this month. Material has been scheduled for the remaining three issues which will appear in 1972. The announcement of the journal has created considerable interest among scientists and engineers, and we are confident that it will lead to much wider utilization of the data produced under the NSRDS program.

Progress has been made in all of the data evaluation projects currently being supported. Four new data compilations have appeared in print since the beginning of fiscal year 1972. The preparation of data sheets on chemical substances involved in air pollution, which was mentioned in the previous hearing, is nearing completion. Although the funding for the program was not increased in fiscal year 1972, several new projects have been started through reprogramming.

The NBS appropriation request for fiscal year 1973, now before the Congress, includes \$2.795 million for the standard reference data program—an increase of about \$500,000. If approved, this increase will be used to initiate new compilation efforts in the areas of mechanical properties of materials, thermodynamics, and kinetics of reactions in solutions, and properties of industrially important gases. Special attention will be given to certain fields where rapid technological developments are expected to take place over the next few years. For example, we are making a study of the data requirements associated with the development of practical methods for production of heating gas from coal. This study involves experts from industry, government, and universities who will advise us on contributions which the standard reference data program can make to this important national effort. Another study is in progress on ways to provide critically needed data on the properties of gases which are used in large quantities in the petrochemical industry.

We expect to pay increasing attention to the existing and anticipated needs for data in major national programs. We believe that the National Standard Reference Data System provides the necessary framework for meeting these needs.

FIRE RESEARCH AND SAFETY PROGRAM

I want to comment next on the program which we conduct under the authority of the Fire Research and Safety Act of 1968. The basic program of research and development aimed at reducing fire casualties and losses that was discussed by Dr. Willenbrock last August has continued. We have strengthened our technical operation by formally integrating management of the scientific activities in support of the Fire Research and Safety Act and the Flammable Fabrics Act now under a new Office of Fire Programs. Two recent activities indicate the synergistic effects possible through integrating these programs.

The first activity culminated in a report entitled "Ignition Sources in Accident Cases Involving Flammable Fabrics." As the title indicates, accident cases originally collected and investigated for the flammable fabrics program have been further analyzed to investigate the source of ignition. Clearly, a fabric fire needs not only a material that will burn, but also an ignition source. Burn injuries can be reduced by attaching either necessary condition. The most interesting fact uncovered was that only a few ignition sources account for most of these flammable fabrics accident cases. Cigarettes are by far the biggest hazard in fires involving bedding and furnishings, while for garments, matches and lighters are the most frequent ignition sources, followed by the kitchen range.

Thus, use of flammable fabrics data has pointed to a need for work in another area of fire safety—that is, the need to examine the safety characteristics of matches, lighters, and kitchen ranges.

In another project we have conducted four full-scale corridor burn tests since October. In these tests we are investigating the spread of fire down a corridor and the effect of the carpet on this fire-spread. As you know, we have promulgated an ignition standard for carpeting, but firespread is a very different thing because of the much larger exposure of the carpet to heat. Our corridor burn program can illuminate the relationships (1) between our present carpet ignition

test, (2) an improved carpet ignition test, and (3) the full-scale fire-spread problem. The results should lead to safer buildings.

Moving to another area, we have developed a purchase specification for a firefighter's turnout coat for a local fire department. This specification contains the elements of a prototype performance standard for such coats, and is designed to encourage innovation among suppliers of these coats which should lead to better protection for firemen. Another project has discovered certain inadequacies in present test methods for fire ladders, and work also has started on the determination of toxic gases to be expected in a fire situation. These activities were spurred by firemen injuries. The more realistic and stricter test methods that may result ultimately should reduce fire injury to the Nation's firefighters.

Additional direct aid to the fire services is coming through a pilot project to develop a system for reporting fire incidents. This system can be used in the management of fire departments to detect trends in the alarm rates in different districts so that resources can be shifted to provide the most effective and economical protection. Also under development are pilot programs to improve the community relations of the fire services (the improvement can be measured by reduction in false alarms and harassment).

Other projects involve developing standard methods of test which will be used to measure the smoke generated when various building materials burn, and work on sprinkler standards to utilize modern technology which may provide a much less expensive system.

For fiscal year 1973, we have requested the appropriation of \$4,928 million for the fire research and safety program. This increase of more than \$3.6 million over the level for fiscal year 1972 would enable us to initiate a series of grants and contracts with city, county, and local fire jurisdictions, universities, and industry to apply existing technology and to develop new technology for fire fighting and prevention. In addition, the in-house programs now underway and planned will be expedited to provide the support required for effective management of the grant and contract effort.

The expanded program will be conducted in close collaboration with the firefighting community and the building design community. Insofar as possible, demonstration programs and investigations will be carried out in local fire departments. The program will have three primary thrusts: Fire prevention, improved fire detection and control, and improvement of firefighting techniques and equipment.

In the area of fire loss prevention, some experimental public education programs will be introduced in selected communities in fiscal year 1973. The effectiveness of improved building inspection and code enforcement techniques will be explored. The problems of protecting and/or removal of people during a fire will be approached in a systems context, with particular attention to the problems of high-rise buildings, hotels, and hospitals.

Currently available smoke and fire detectors will be evaluated to develop performance criteria for detector selection and improved detector design and location practice. Automatic fire suppression systems, such as sprinklers, will be studied to determine the feasibility of developing systems for residential as well as commercial use.

Expanded programs in support of the fire services will include demonstration projects to test protective gear, and performance standards for new equipment aimed at lowering acquisition and maintenance costs. Demonstration projects for regional fire dispatch centers will be organized so that areas containing numerous small fire service jurisdictions can be better protected. A program to stimulate interchange of techniques and ideas in the fire service through interdepartmental exchange of personnel also is proposed.

In addition, strengthened research, data collection, and information dissemination programs will support these new activities. We view this major expansion of the fire research and safety program, planned for fiscal year 1973, as a major step toward the development of a program of sufficient size to make a significant impact on the national fire problem.

CONTINUING AUTHORIZATION

Before leaving the two authorization requests, I want to note that we are particularly pleased that H.R. 13034 would authorize appropriations for these important programs for subsequent years as well as fiscal year 1973. As Dr. Branscomb indicated in his testimony concerning this matter, we believe that a continued authorization, consistent with the authorization for the great majority of NBS activities, is appropriate for these programs because of their continuing nature and accumulating value. While we prefer that the planning and budgetary process for these activities be similar to that of most other NBS programs, as would be the case if H.R. 13034 is enacted, we shall welcome the opportunity to report our progress at such times as the subcommittee may desire.

ORGANIC ACT AMENDMENTS

I would now like to review the amendments to the NBS Organic Act which are incorporated in H.R. 13034. We propose five relatively minor amendments to the act of March 3, 1901, as amended, to clarify our authority in certain matters and permit improvements in our fiscal and administrative practices.

A detailed statement of purpose and need accompanied the draft legislation when it was submitted to the Congress by the Department of Commerce. I shall attempt to summarize that statement, and illustrate the need for the proposed amendments.

MULTIPLE YEAR APPROPRIATIONS

First, we propose the addition of a new section 18 to the Organic Act which would provide statutory authorization for appropriations for NBS to be on a multiple-year basis, or without fiscal year limitation in special cases. The need for such flexibility with respect to appropriations for certain research and development activities arises from the many uncertainties in planning and scheduling of such work. This need is widely recognized, and most Federal agencies engaged in research and development programs have been granted the authorization that we seek.

The proposed amendment alone would not result in multiple-year appropriations for NBS. The final determination whether to limit the availability of appropriations is made when the Congress acts on the appropriation bill. However, an appropriation bill providing for a departure from single-year availability would be subject to a point of order if an authorizing statute had not previously been enacted.

The need for multiple-year appropriations becomes most apparent when initiating major new programs. The complex interacting problems involved in the recruitment of staff, procurement of equipment, and negotiation of contracts for new endeavors are further complicated when funds expire at the end of 1 fiscal year and the level of support for the succeeding year is uncertain.

A good example can be found in the NBS appropriation request for fiscal year 1973. We are seeking \$14.4 million for the new experimental technology development and application incentives program proposed by the President in his 1973 budget message. This experimental program will investigate the usefulness of a variety of incentives and mechanisms to stimulate the generation and application of research and development in ways that will make our economy more competitive with other nations, improve its productivity and provide new technological solutions to national problems.

The program will be conducted in close collaboration with the non-Federal sector. Most of the funding will be devoted to cost-sharing contracts to support joint experiments with industry and trade associations, groups of small companies, private standardization bodies, State and local governments and other organizations.

The urgent need for the results of this program demands that it be implemented as fully as possible in fiscal year 1973. However, the evaluation of projects proposed by private groups, and the development of effective cooperative mechanisms will be time consuming. It also can be anticipated that the non-Federal partners in these experiments may experience delays in arranging their share of the funding. These and other uncertainties create some questions concerning our ability to obligate all of the \$14.4 million in 1 year in an efficient and effective manner.

For these reasons we have requested that the portion of our fiscal year 1973 appropriation intended for this new program be made available without fiscal year limitation. Without the authorization that would be provided by adding the proposed section 18 to our Organic Act, such an appropriation could be subject to a point of order objection.

AUTHORITY TO TEACH

The second amendment that we propose would clarify the authority of the Bureau to engage in teaching and training activities at institutions of higher learning in areas of special NBS competence.

Paragraph 19 of section 2 of the NBS Organic Act provides the basis for the extensive program of publications, exhibits, and demonstrations through which the science and technology evolved at NBS are transferred to the scientific and industrial community. Under its authority, we annually issue hundreds of technical publications and join in the sponsorship of numerous symposia designed to acquaint scientists and engineers with the latest developments that are within the sphere of competence of NBS.

One of the most effective ways to accomplish this transfer of highly technical knowledge and skills is through teaching and training activities. This has been demonstrated through numerous special training courses that the Bureau has conducted at various times on subjects ranging from radio frequency measurements to inspection techniques used by State and local weights and measures officials.

In general, these teaching and training efforts have been programs of limited duration conducted in the Bureau's own facilities. A notable exception is the Joint Institute for Laboratory Astrophysics (JILA) that we have operated in cooperation with the University of Colorado on the university campus since 1962.

At that time, it was determined that this Nation's objectives in space and in other emerging fields of science and technology required a substantially increased research effort in the measurement problems peculiar to hot gases and stellar atmospheres. Moreover, there were few scientists in this country trained in this highly specialized field known as laboratory astrophysics, and there was no academic institute devoted primarily to such research and training of students.

While NBS had some unique talents and facilities in this field, it was concluded that the expansion of research and training activities needed to meet national goals could only be accomplished in an academic setting. Accordingly, JILA was established in cooperation with the University of Colorado on the campus of the university. Here, Government and university scientists, together with distinguished visiting scientists from all over the world, have worked in close collaboration to produce outstanding research results and an exceptional center for graduate study in this specialized field.

A key element in the success of JILA was the administrative determination that NBS scientists at JILA be permitted to participate in teaching activities as part of their official duties. This was considered essential in view of the particular objectives and circumstances associated with that program. The university for its part contributes research support by graduate students assigned to the NBS projects.

While we have no immediate plans for the establishment of another joint institute, the unusual success of that arrangement has convinced us that active participation in the programs of academic institutions may be, in selected cases, the most effective way for NBS to discharge some of its responsibilities. The proposed amendment to section 2 would specifically authorize the use of NBS scientific or technical personnel for part-time or intermittent teaching or training activities at educational institutions of higher learning without additional compensation as a part of their official duties. This clarification of the Bureau's authority to use such means for transferring its technical expertise and enhancing its research programs would facilitate the development of appropriate cooperative programs with the academic community.

SERVICES FOR FOREIGN INSTITUTIONS

The third amendment would clarify the authority of the Bureau to perform its services for international organizations and for friendly countries and their institutions. At present, section 3 of the Organic Act provides specific authority for NBS to exercise its functions only for the Federal Government, State and local governments, and for institutions and firms in the United States.

The need for this clarification stems primarily from the ever-increasing significance of measurement services and standardization activities as vital elements in the international trade of the United States. In recent years, our country has become increasingly dependent on the export of high technology products. The Secretary of Commerce has emphasized in his report to the Congress on the U.S. metric study the importance of U.S. participation in the expanding international standardization activities associated with these products if the United States is to maintain its favorable competitive position. Closely related is the need for adequate international exchange of measurement science and services.

For many years the Bureau has cooperated with the national standards laboratories of other nations, working in close coordination with the Department of State and with the International Bureau of Weights and Measures that was established by the Treaty of the Meter. We also have cooperated with other foreign scientific institutions when they were engaged in studies of direct concern to NBS or other Federal agencies. These activities have been considered necessary for NBS to fulfill its responsibilities for the correlation of our national measurement system with those of other nations.

In addition, the standard reference materials that are prepared and sold by the Bureau have been purchased in substantial quantities by foreign laboratories. These highly characterized reference materials are used in a variety of technological operations to check the chemical composition, color, viscosity, and other basic properties of numerous kinds of materials. The determination of kind and form of reference materials to be offered by the Bureau has been dictated by the needs of U.S. industry. However, their sale to foreign organizations is equally necessary because reference materials provide an important basis for determining the nature and quality of many products sold in international trade. Moreover, these reference materials are designed for and work best with U.S. analytical equipment, thus encouraging the use of these products in foreign laboratories.

While the Bureau has felt justified to participate in cooperative international scientific exchanges, and its products such as publications and reference materials have been sold to foreign customers, NBS has been hesitant about extending its various technical services directly to foreign organizations because of the limitations implied in its organic act. At present, calibration and measurement services normally are provided for foreign organizations only when the request is made by another national standards laboratory, or is endorsed by another Federal agency such as the Department of State.

Yet, in many cases such services could be an important factor in facilitating international trade. In particular, the extension of calibration and related measurement services to underdeveloped countries would encourage the purchase and use of U.S.-produced instruments and equipment in their laboratories and emerging industries. Through their adoption of measurement devices and techniques compatible with U.S. practice, the way is cleared for continuing fruitful exchange of goods and services with the United States.

The need to support U.S. interests in international trade and commerce is also the basic reason that NBS services should be available to international organizations and friendly foreign governments con-

cerned with the development of the technical standards and specifications that increasingly influence the course of such trade.

The proposed clarification of the authority of NBS would enable it to respond more rapidly and effectively in those situations where its services can make an important contribution to U.S. objectives in international trade and international scientific programs. These services would be provided selectively when they are not available elsewhere, and are essential to U.S. objectives. It is not the intention of NBS to extend its services automatically to all foreign customers. As NBS services to commercial laboratories normally are on a reimbursable basis, the proposed assistance to commercial organizations of other nations would be at no additional cost to the United States.

LIMITATION ON CONSTRUCTION AND IMPROVEMENT OF FACILITIES

The fourth amendment which we seek would increase the monetary limitation on construction and improvement of NBS buildings and facilities. The Bureau's ever-changing activities in science and technology require occasional minor additions in our facilities. Section 14 of the organic act presently limits the size of such construction or improvement projects to \$40,000 unless specific provision is made for the project in the appropriation concerned.

While specific appropriation authority is requested for extensive construction and improvement of buildings and facilities, it is not always possible to anticipate relatively minor needs that far in advance. However, the \$40,000 limitation on such unexpected projects has become so restrictive because of increased construction costs since 1958 when that level was set, that even comparatively small projects frequently must be delayed until specific appropriation authority is obtained. To avoid these inefficient delays, we request that the limitation of unscheduled construction and improvements be raised to \$75,000.

PROTECTION OF NBS PROPERTY

The last of the proposed amendments would alter section 15(b) of the organic act by granting the Secretary of Commerce the authority to provide care, maintenance, and protection of the buildings and property of NBS without limiting such authority to buildings located in the District of Columbia as provided in the act of April 29, 1926, which assigned this responsibility to the Secretary. The Bureau has moved its offices and staff from the District of Columbia to Gaithersburg, Md., and also operates a large installation in Boulder, Colo. It is important, therefore, that the authority of the Secretary to provide for the care, maintenance, and protection of NBS property outside the District of Columbia be clearly established.

CONCLUSION

In conclusion, I wish to observe that the legislative authority that would be granted through enactment of H.R. 13034 would not significantly alter the basic functions or responsibilities of the Bureau. However, enactment of this legislation is needed to authorize appro-

priations for two important continuing programs. In addition, it would resolve some uncertainties that have troubled NBS management for several years and would facilitate more efficient management procedures. For these reasons, we urge your favorable consideration of H.R. 13034.

Mr. HANNA. Thank you very much. You have given us a pretty full coverage of the major portions of the bill. I want to get a little expansion on what you have said here with a few questions.

You have on page 2 indicated that you believe that the journal that you are putting out will lead to a wider utilization of the data that is being produced now. What is your coverage now? What kind of use is there of the data produced under the NSRDS programs prior to the journal?

Dr. KUSHNER. Mr. Chairman, may I call on Dr. Edward Brady, who supervises this program, to provide a more complete answer?

Mr. HANNA. Yes.

Dr. BRADY. We have various ways of measuring the usefulness and the impact of the data, Mr. Hanna. We have the figures for the distribution of each of the publications that have been produced. These figures run between 2,000 and 4,000 copies of each of the publications that have been produced so far. We also have a history of incidents involving the use of the data that indicate the impact in some specific cases; that is, we have both a quantitative measure of use by the sales and distribution figures, and some qualitative indications of the effects the use of the data actually has had in design of equipment and saving of time of the individual scientists.

Mr. HANNA. Are you users primarily people in the scientific community?

Dr. BRADY. We have some figures on that, sir. The figures indicate that the largest number of purchasers are from private industry. The second is from the academic community. And third from Government laboratories.

Mr. HANNA. You say you are going to move into new data compilations. What are your future plans for the new data compilations right now? Where do you stand in terms of your planning?

Dr. BRADY. For the plans for future years, for fiscal 1973 and onward, we are planning to initiate a number of new projects in mechanical properties of substances, for example, such properties as the strength of materials, the relationship between stress and strain of materials, breaking strengths, elastic limits, elastic constants, and such data.

We also are proposing to expand the work on the thermodynamics and kinetics of reactions that occur in solution. This would include data on the rate at which reactions occur in both aqueous and non-aqueous solutions, data on the heats evolved in the reactions, solubilities, and related data. These kinds of data are needed for application in all chemical process development and in such studies as control of pollution, and control of the environmental effects of chemical and metallurgical processes of all kinds.

Mr. HANNA. I am glad you put that last part in because, I think, one of the great needs that we have in the data field right now is to get a base line from which we can develop standards that are enforceable for improvement in the atmosphere.

I think if you could make clear that this is one of the things we are going to accomplish, that you are driving toward, that you'd get a lot of support for an expansion in this particular program.

I think as we move along and see the performance records of the Clean Air Act, the Clean Water Act, we are going to realize that we set up standards that are going to be awfully hard to achieve because we don't know where the base line is.

I am glad to hear you put that into your explanation.

You say on page 4 that you have a report surrounding ignition sources involved with flammable fabrics and you indicated that a lot of these would come from common household areas. Do you have a copy of that report that could be made a part of this record?

Dr. KUSHNER. We will be happy to make that available.

It may be appropriate to emphasize that the study covered by that report utilized flammable fabric accident data. Thus the study derived support from both the fire research and safety program and the flammable fabrics program which, of course, is subject to separate authorization.

Mr. HANNA. All right, without objection it will be incorporated.
(Information requested for the record follows:)

NATIONAL BUREAU OF STANDARDS REPORT

10 629

IGNITION SOURCES IN ACCIDENT CASES INVOLVING FLAMMABLE FABRICS



· U.S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

NATIONAL BUREAU OF STANDARDS

The National Bureau of Standards¹ was established by an act of Congress March 3, 1901. Today, in addition to serving as the Nation's central measurement laboratory, the Bureau is a principal focal point in the Federal Government for assuring maximum application of the physical and engineering sciences to the advancement of technology in industry and commerce. To this end the Bureau conducts research and provides central national services in four broad program areas. These are: (1) basic measurements and standards, (2) materials measurements and standards, (3) technological measurements and standards, and (4) transfer of technology.

The Bureau comprises the Institute for Basic Standards, the Institute for Materials Research, the Institute for Applied Technology, the Center for Radiation Research, the Center for Computer Sciences and Technology, and the Office for Information Programs.

THE INSTITUTE FOR BASIC STANDARDS provides the central basis within the United States of a complete and consistent system of physical measurement; coordinates that system with measurement systems of other nations; and furnishes essential services leading to accurate and uniform physical measurements throughout the Nation's scientific community, industry, and commerce. The Institute consists of an Office of Measurement Services and the following technical divisions:

Applied Mathematics—Electricity—Metrology—Mechanics—Heat—Atomic and Molecular Physics—Radio Physics²—Radio Engineering²—Time and Frequency²—Astrophysics²—Cryogenics.²

THE INSTITUTE FOR MATERIALS RESEARCH conducts materials research leading to improved methods of measurement standards, and data on the properties of well-characterized materials needed by industry, commerce, educational institutions, and Government; develops, produces, and distributes standard reference materials; relates the physical and chemical properties of materials to their behavior and their interaction with their environments; and provides advisory and research services to other Government agencies. The Institute consists of an Office of Standard Reference Materials and the following divisions:

Analytical Chemistry—Polymers—Metallurgy—Inorganic Materials—Physical Chemistry.

THE INSTITUTE FOR APPLIED TECHNOLOGY provides technical services to promote the use of available technology and to facilitate technological innovation in industry and Government; cooperates with public and private organizations in the development of technological standards, and test methodologies; and provides advisory and research services for Federal, state, and local government agencies. The Institute consists of the following technical divisions and offices:

Engineering Standards—Weights and Measures—Invention and Innovation—Vehicle Systems Research—Product Evaluation—Building Research—Instrument Shops—Measurement Engineering—Electronic Technology—Technical Analysis.

THE CENTER FOR RADIATION RESEARCH engages in research, measurement, and application of radiation to the solution of Bureau mission problems and the problems of other agencies and institutions. The Center consists of the following divisions:

Reactor Radiation—Linac Radiation—Nuclear Radiation—Applied Radiation.

THE CENTER FOR COMPUTER SCIENCES AND TECHNOLOGY conducts research and provides technical services designed to aid Government agencies in the selection, acquisition, and effective use of automatic data processing equipment; and serves as the principal focus for the development of Federal standards for automatic data processing equipment, techniques, and computer languages. The Center consists of the following offices and divisions:

Information Processing Standards—Computer Information—Computer Services—Systems Development—Information Processing Technology.

THE OFFICE FOR INFORMATION PROGRAMS promotes optimum dissemination and accessibility of scientific information generated within NBS and other agencies of the Federal government; promotes the development of the National Standard Reference Data System and a system of information analysis centers dealing with the broader aspects of the National Measurement System, and provides appropriate services to ensure that the NBS staff has optimum accessibility to the scientific information of the world. The Office consists of the following organizational units:

Office of Standard Reference Data—Clearinghouse for Federal Scientific and Technical Information³—Office of Technical Information and Publications—Library—Office of Public Information—Office of International Relations.

¹ Headquarters and Laboratories at Gaithersburg, Maryland, unless otherwise noted; mailing address Washington, D.C. 20234.

² Located at Boulder, Colorado 80302.

³ Located at 5245 Port Royal Road, Springfield, Virginia 22151.

NATIONAL BUREAU OF STANDARDS REPORT**NBS PROJECT**

4053200

November 11, 1971

NBS REPORT

10 629

IGNITION SOURCES IN ACCIDENT CASES INVOLVING FLAMMABLE FABRICS

by

Henry Tovey

and

Richard R. Giroux

IMPORTANT NOTICE

NATIONAL BUREAU OF STANDARDS REPORTS are usually preliminary or progress accounting documents intended for use within the Government. Before material in the reports is formally published it is subjected to additional evaluation and review. For this reason, the publication, reprinting, reproduction, or open-literature listing of this Report, either in whole or in part, is not authorized unless permission is obtained in writing from the Office of the Director, National Bureau of Standards, Washington, D.C. 20234. Such permission is not needed, however, by the Government agency for which the Report has been specifically prepared if that agency wishes to reproduce additional copies for its own use.

**U.S. DEPARTMENT OF COMMERCE****NATIONAL BUREAU OF STANDARDS**

TABLE OF CONTENTS

	<u>Page</u>
1. Introduction	1
2. Some Observations on Sources of Ignition in Flammable Fabric Cases	1
3. Tables	
Table 1: Sources of Ignition for Major Fabric Product Categories	2
Table 2: Sources of Ignition and Intermediary Materials for Garment Cases	4
Table 3: Sources of Ignition and Intermediary Materials for Furnishings Cases	5
Table 4: Sources of Ignition and Intermediary Materials for Bedding Cases	6
Table 5: Ranges as Sources of Ignition for Major Fabric Product Categories	7
Table 6: Gas Ranges as Sources of Ignition for Major Fabric Product Categories, and Intermediary Materials Involved	7
Table 7: Electric Ranges as Sources of Ignition for Major Fabric Product Categories, and Intermediary Materials Involved	8
4. The Flammable Fabrics Accident Case and Testing System	8

Ignition Sources in Accident Cases Involving Flammable Fabrics

1. INTRODUCTION

The Flammable Fabrics Accident Case and Testing System of the Office of Flammable Fabrics, National Bureau of Standards, has two primary functions. The first is to develop candidate priorities for national mandatory standards for the flammability of fabric products. The second is to provide the basis for the development of realistic tests, which can discriminate between highly hazardous products and those of lower potential hazard.

However, the FFACT System can also provide insights into other aspects of the flammable fabric product problem. Thus, for example, an examination of the data in FFACTS indicates that appropriate modifications of a few frequently involved ignition sources, such as matches and ranges, could lead to a significant reduction in deaths, injuries, and property losses suffered by the American people as a result of accidental fabric fires.

This report provides a preliminary look at the fabric flammability problem from the point of view of the ignition source.

2. SOME OBSERVATIONS ON SOURCES OF IGNITION IN FLAMMABLE FABRIC CASES

The following seven tables present data on the involvement of ignition sources in flammable fabric accident cases in the FFACT System. It should be noted that the cases in FFACTS have not been selected on a statistical basis, and that they do not, therefore, constitute a statistically representative sample of all fabric fire accidents in the United States. Thus, garment cases make up 3 out of 4 cases cited, with furnishings and bedding cases sharing the remainder about equally; however, this distribution is probably a reflection of an early bias of the system in favor of apparel cases. But while the data are not based on a statistically designed sample, it is believed that they can provide insight into the relative role of the various ignition sources in flammable fabric accidents.

The tables in this report have been derived from a data base of 1090 cases in the FFACT System on October 21, 1971. For these 1090 cases the originating source of ignition was known for 1041 cases, and both the sources of ignition and the fabric product category first to ignite were known for 946 cases.

The major types of ignition sources in these flammable fabric accident cases are matches or lighters, kitchen ranges, cigarettes, and open fires.

Flame sources constitute a very large part of the flammable fabric problem, and they are dominant for all apparel fabric products. Matches or lighters constitute the largest ignition source group for garments, but they are rather closely followed by kitchen ranges. Cigarettes play a minor role in garment cases, but constitute the most important ignition source group in furnishings and bedding cases, where they represent 60% of all ignition sources.

Flammable liquids or other intermediary materials are involved in nearly a half of all cases in which garments were the first fabric product to ignite; but only about 15% of furnishings cases, and 5% of bedding cases involve intermediary materials.

When only sources which ignited fabric products directly, without involvement of flammable liquids or other intermediary materials, are considered, ranges become more important as ignition sources for garments than matches or lighters. In 9 out of 10 cases involving ranges, ignition occurred through direct contact between the fabric product and the range. Gas ranges account for 2 out of 3 cases involving ranges.

3. TABLES

TABLE 1: SOURCES OF IGNITION FOR MAJOR
FABRIC PRODUCT CATEGORIES

<u>SOURCE</u>	<u>GARMENTS</u>	<u>FURNISHINGS</u>	<u>BEDDING</u>	<u>TOTAL</u>
Match/Lighter	211 (28%)	15 (12%)	22 (19%)	248 (25%)
Cigarettes/ Smoking Materials	42 (6%)	74 (61%)	69 (61%)	185 (19%)
Kitchen Range	156 (21%)	11 (9%)	2 (2%)	169 (17%)
Open Fires	129 (17%)	1 (1%)	1 (1%)	131 (13%)
All Others	<u>203 (27%)</u>	<u>20 (17%)</u>	<u>20 (18%)</u>	<u>243 (25%)</u>
TOTAL	741 (99%)	121 (100%)	114 (101%)	976 (99%)

Table 1 presents data on 976 cases selected from 1090 cases in FFACTS on October 12, 1971, on the basis of two selection criteria: for each of these cases both the initial source of ignition, and the first fabric products to ignite were known.

The primary sources of ignition for fabric products are matches or lighters, cigarettes or other smoking materials, kitchen ranges, and open fires. For garments, the primary ignition sources are matches or lighters, with ranges second, and open fires third. Cigarettes or other smoking materials are but a minor ignition source for garments, but are primary for both furnishings and bedding. Matches or lighters are a far second in furnishings and bedding cases.

TABLE 2: SOURCES OF IGNITION AND INTERMEDIARY MATERIALS FOR GARMENT CASES

<u>INTERMEDIARY MATERIALS</u>										
ORIGINATING OBJECT	NONE	FLAM. LIQ.	GAS	GREASE	TRASH	EXPLO- SIVE	OTHER	UN- KNOWN	TOTAL	
MATCH- LIGHTER	109	57	29	2	5	3	4	2	211	(28%)
KITCHEN RANGE	137	6	1	7			3	2	156	(21%)
OPEN FIRE	46	73		3	2		1	4	129	(17%)
CIGARETTE/ CIGAR	29	9	1		1		1	1	42	(6%)
ENGINE	1	33			2			1	37	} (28%)
HOTWATER HEATER	1	24	2		1		1		29	
SPACE HEATER	13	8					1		22	
HEATER, UNSPEC	3	1					1		5	
WELDING TORCH	5	8					4		17	
FURNACE	2	6	5			2			15	
APPLIANCE, OTHER	5	6	1				1	1	14	
ELECT. WIRING	10	3					1		14	
CANDLE	6	5		1					12	
WORK TOOLS, OTHER	1	2							3	
OTHER	8	22	5						35	
TOTAL	376	263	44	13	11	5	18	11	741	(100%)

Table 2 presents data on the 741 garment cases shown in table 1. They were selected from 1090 cases in FFACTS on October 12, 1971, on the basis of two selection criteria: a garment was the first fabric product to ignite; and the source of ignition was known.

About half of these cases involved intermediary materials in the ignition sequence, and about 1 in 3 cases involved flammable liquids. Matches or lighters constitute the most frequent ignition source group, with kitchen ranges and open fires second and third. However, considering only fires in which the garment was ignited directly by the original ignition source, ranges displace matches from the first place, and open fires drop to a far-removed third place. Only about 10% of all range cases involved intermediary materials in the ignition sequence, but 50% of match cases, and 65% of open fire cases involved intermediary materials. Cigarettes or other smoking materials constitute only about 5% of all garment ignition sources.

TABLE 3: SOURCES OF IGNITION AND INTERMEDIARY MATERIALS FOR FURNISHINGS CASES

<u>ORIGINATING OBJECT</u>	<u>INTERMEDIARY MATERIAL</u>						<u>TOTAL</u>	
	<u>NONE</u>	<u>FLAM. LIQ.</u>	<u>GREASE</u>	<u>GAS</u>	<u>TRASH</u>	<u>OTHER</u>		
CIGARETTE/ CIGAR	70					4	74	(61%)
MATCH/LIGHTER	11	1		1	1	1	15	(12%)
KITCHEN RANGE	4		7				11	(9%)
ELECT. WIRING	6					1	7	} (17%)
CANDLE	2					2	4	
APPLIANCE, OTHER	2					1	3	
SPACE HEATER	2						2	
FURNACE	1						1	
OPEN FIRE	1						1	
OTHER	2					1	3	
TOTAL	101	1	7	1	1	10	121	(99%)

Table 3 presents data on the 121 furnishings cases shown in table 1. They were selected from 1090 cases in FFACTS on October 12, 1971, on the basis of two selection criteria: furnishings were the first fabric product to ignite; and the source of ignition was known.

Intermediary materials were involved in the ignition sequence for only about 15% of these cases, with grease being the most frequently encountered one (7 out of 11 kitchen range cases involved grease as an intermediary material in the ignition sequence). Cigarettes or other smoking materials accounted for about 60% of all furnishings cases, and for 70% of all furnishings cases in which no intermediary materials were involved. Matches or lighters are second, and ranges are third, with 12% and 9%, respectively.

TABLE 4: SOURCES OF IGNITION AND INTERMEDIARY MATERIALS FOR BEDDING CASES

<u>ORIGINATING OBJECT</u>	<u>INTERMEDIARY MATERIAL</u>				
	<u>NONE</u>	<u>GAS</u>	<u>OTHER</u>	<u>TOTAL</u>	
CIGARETTE/CIGAR	68		1	69	(72%)
MATCH/LIGHTER	19	1	2	22	(19%)
APPLIANCE, OTHER	4			4	} (9%)
ELECT. WIRING	4			4	
CANDLE	4			4	
SPACE HEATER	2			2	
KITCHEN RANGE	1		1	2	
OPEN FIRE	1			1	
OTHER	6			6	
TOTAL	109	1	4	114	(100%)

Table 4 presents data on the 114 bedding cases shown in table 1. They were selected from 1090 cases in FFACTS on October 12, 1971, on the basis of two selection criteria: bedding was the first fabric product to ignite; and the source of ignition was known.

Very few bedding cases involved intermediary materials in the ignition sequence--less than 5% of the total. Cigarettes or lighters constitute the dominant ignition source group, accounting for nearly 3 out of 4 bedding cases. Matches or lighters are second, accounting for nearly 1 out of 5 cases.

TABLE 5: RANGES AS SOURCES OF IGNITION FOR
MAJOR FABRIC PRODUCT CATEGORIES

<u>RANGE</u>	<u>GARMENTS</u>	<u>FURNISHINGS</u>	<u>BEDDING</u>	<u>TOTAL</u>	
GAS	102	4	2	108	(67%)
ELECTRIC	46	4	0	50	(30%)
OTHER, KNOWN	3	1	0	4	(2%)
UNSPECIFIED	5	2	0	7	
TOTAL	156	11	2	169	(99%)

Table 5 presents data on the 169 kitchen range cases shown in table 1. They were selected from 1090 cases in FFACTS on October 12, 1971, on the basis of two selection criteria: that source of ignition was a kitchen range; and the first fabric products to ignite were known.

Gas ranges account for 2 out of 3 range cases.

TABLE 6: GAS RANGES AS SOURCES OF IGNITION FOR MAJOR FABRIC
PRODUCT CATEGORIES, AND INTERMEDIARY MATERIALS INVOLVED

<u>FABRIC PRODUCT CATEGORY</u>	<u>INTERMEDIARY MATERIAL</u>					<u>TOTAL</u>
	<u>NONE</u>	<u>FLAM. LIQ.</u>	<u>GREASE</u>	<u>OTHER</u>	<u>UNKNOWN</u>	
GARMENTS	90	5	2	3	2	102
BEDDING	1	0	0	1	0	2
FURNISHINGS	3	0	1	0	0	4
TOTAL	94	5	3	4	2	108
	(89%)	(11%)				(100%)

Table 6 presents data on the 108 gas range cases shown in table 5. They were selected from 1090 cases in FFACTS on October 12, 1971, on the basis of four selection criteria: for each of these cases the initial source of ignition was known; that source of ignition was a kitchen range; that range was a gas range; and the first fabric products to ignite were known.

Only 1 in 10 gas range cases involved intermediary materials in the ignition sequence. Nearly all the gas range cases are garment cases--102 out of a total of 108.

TABLE 7: ELECTRIC RANGES AS SOURCES OF IGNITION FOR MAJOR FABRIC PRODUCT CATEGORIES, AND INTERMEDIARY MATERIALS INVOLVED

<u>FABRIC PRODUCT CATEGORY</u>	<u>INTERMEDIARY MATERIAL</u>			<u>TOTAL</u>
	<u>NONE</u>	<u>GREASE</u>	<u>GAS</u>	
GARMENTS	42	3	1	46
BEDDING	0	0	0	0
FURNISHINGS	0	3	0	3
TOTAL	42	6	1	49
	(86%)	(14%)		(100%)

Table 7 presents data on the 49 electric range cases shown in table 5. They were selected from 1090 cases in FFACTS on September 12, 1971, on the basis of four selection criteria: for each of these cases the initial source of ignition was known; that source was a kitchen range; that range was an electric range; and the first fabric products to ignite were known.

Only 1 in 7 of the electric range cases involve an intermediary material in the ignition sequence. Nearly all electric range cases are garment cases--46 out of a total of 49.

4. THE FLAMMABLE FABRICS ACCIDENT CASE AND TESTING SYSTEM

Section 14a of the Flammable Fabrics Act, as revised and amended December 14, 1967, states that the Secretary of Health, Education, and Welfare in cooperation with the Secretary of Commerce shall conduct a continuing study and investigation of deaths, injuries and economic losses resulting from accidental burning of fabric products. In the spirit of this legislative mandate, the two Agencies are cooperating

to obtain the needed information. Fire accident cases involving fabric products are investigated by Food and Drug Administration investigators using questionnaires developed in cooperation with the Office of Flammable Fabrics. Reports on these cases, together with remains of the fabric products involved, are sent to the Office of Flammable Fabrics for analysis and testing.

The Office of Flammable Fabrics processes the reports and fabric remains received from Food and Drug Administration through its Flammable Fabric Accident Case and Testing System (FFACTS). The procedures under this system include reviewing and screening of case reports, laboratory testing and characterization of the fabric product involved in the accident, data encoding, formatting, editing, and entry into a computer master file. As many as 200 data elements can be coded for each fire accident case. The encoded data are derived from the report on the accident case, and they include information on the time and location of the accident, personal and socio-economic facts about the victim, extent of injury and losses, the sequence of events leading to the accident, and the nature of involvement of the fabric product. Data derived from laboratory tests performed on the remains of the fabric products involved in the accident, such as data on fabric construction and fiber content, and the results of flammability tests, are also encoded.

Data in the computer master file are queried and subjected to statistical analyses to provide quantitative information on the relative frequencies of the involvement of different fabric products, as well as qualitative information on trends and significant interrelationships. Such information is further analyzed and interpreted to develop candidate priorities for national mandatory standards for the flammability of fabric products; to provide the basis for the development of realistic tests which can discriminate between highly hazardous products and those of lower potential hazard; and to provide other insights into the many aspects of the flammable fabric problem. The overall objective of the system is to identify and provide assistance in ranking the various ways of reducing the burden of deaths, injuries, and economic losses sustained by the American people from accidental burning of fabric products.

You also indicated that you have a report that is coming out on the corridor burn program, could we have a copy of that and when will that data be available?

Dr. KUSHNER. May I ask Dr. Walters?

Dr. WALTERS. Yes; this project is being sponsored jointly by the National Bureau of Standards and by the Department of Health, Education, and Welfare. We don't have a final report ready on that yet; we are doing the research now that we hope will lead to a conclusion in the report that will come early in 1973.

Mr. HANNA. Do you have any indication of what reaction can be anticipated from the suppliers of some of these things that are involved in fire research such as flammable fabrics, carpet materials, products to protect firemen, have you had any interface with the supplier themselves as you go along with these tests?

Dr. WALTERS. We have a great deal of interaction with the carpet and rug manufacturers, and with the fire services in this program.

I think their principal concern is that whatever standards are promulgated in this area should call for tests that are closely related to the real problem. We face a difficulty here because in the corridor heat is reflected from the walls and ceilings, creating a very difficult problem in establishing a standard that would call for a test, say, on just a carpet, but would allow prediction of how that carpet would behave in a real corridor, with wall and ceiling interactions. I think we have good interactions with all of these concerned groups and we are all anxious to see the program brought to a successful conclusion.

Mr. HANNA. I am glad to hear you report that because I think when you can involve these people at the test points then they are more apt to be a cooperative unit rather than to take the results of your tests and become adversaries to show why you are wrong.

Dr. WALTERS. That is right. Might I add that we actually have working on this problem two research associates, placed at the Bureau of Standards by concerned groups. One is from the Underwriters Laboratories. The other is from the Tennessee Eastman Corp., a manufacturer of materials that are used in carpet construction.

Mr. HANNA. Is the Bureau working with the President's Commission on Fire Prevention and Control?

Dr. KUSHNER. Yes; we are, Mr. Chairman.

Mr. HANNA. What is the work relationship, in what way do you interface?

Dr. KUSHNER. There are two ways in which we are working with the Commission. Dr. Karl Willenbrock, the Director of our Institute for Applied Technology serves on the Commission as the personal representative of the Secretary of Commerce who is a member of the Commission by statutes.

In addition through Dr. Willenbrock and in much correspondence we have had with and about the Commission, the Bureau has pledged its cooperation to the fullest possible extent with the Commission.

Mr. HANNA. Well, I suspect if you don't cooperate you are going to hear from Chairman Miller. I understand you are a member of the Commission, Mr. Chairman.

Mr. MILLER. I might say that the committee is meeting right now over in the Senate caucus room and I had the privilege of speaking to them yesterday but some other things have tied me up this morning so I was not able to be present.

I think the Commission is doing a very good job, but the Commission, like many other such groups, is composed of people who have been engaged in one way or the other in the matter of fire prevention and control, and they are pretty sold in their position as to how these things should be done.

You have to have some new approaches, that is what I told them yesterday, we have to get away from some of the old things and of course the Bureau of Standards is the mother of this organization, they are going to depend upon you a great deal. We are going to depend upon you. It is a long time since we got into the matter of fire control on the basis of just the empiric matter of throwing water on fires.

Dr. KUSHNER. We are very anxious for the Commission to complete its study and issue a report because we believe that report will have a very important bearing on the future direction of the program which we are proposing to undertake.

Mr. MILLER. There is a younger man that is not in this hearing room. He is a chemist by training and has a degree in chemistry but for years has been out at the Lawrence Radiation Laboratory and has been in charge of their fire control studies and he approaches this matter the way that you would approach it. He is not hardfast that you jump on a truck and blow the siren and get out there in a hurry, you do other things, and of course when you come to controlling fires in this field, I don't know that there is any great amount of knowledge, but it is one that will be with us, the matter of use of nuclear energy and nuclear science will be widespread throughout the country in the future.

This is something that one has to take a good look at and I am glad that he is over there this morning talking to them.

Mr. HANNA. Thank you Mr. Chairman, I turn the gavel back over to Mr. Davis. I have a couple of more questions that I wanted to ask that would relate to the testimony that was just heard.

Mr. DAVIS. Go ahead.

Mr. HANNA. In talking about the amendment that would give the Bureau continuing authorization, I gathered from the several sections of your testimony that first of all you do feel that you need the continuing authorization so that you can efficiently utilize the amount of money you are asking for this year, that there is a good likelihood that you couldn't, given the setup time and the interactions between yourselves and those that you want to work with you on the program, actually be able to obligate that money in a sensible way if you had to do it within the fiscal year?

Dr. KUSHNER. Yes, sir.

Mr. HANNA. The second reason I gathered from your testimony is that it would give you a flexibility in adjusting the funds to the way the program would itself flow which is difficult to see at a startup time, is that correct?

Dr. KUSHNER. That is correct, Mr. Hanna. In research and development activities in particular, it is very difficult to predict a schedule by which the work is likely to proceed. From the standpoint of most effective utilization of the funds the Congress sees fit to appropriate to us, it is desirable that we have the authority to utilize them over a period of time which may exceed 1 fiscal year.

Mr. HANNA. I take it from what you have said that a third reason is the fact that you are going to be utilizing the kind of manpower

that it is awfully difficult to put together if you have a very uncertain predictability as to their being able to see a continual relationship for some period of time. Isn't that really quite a factor in this?

Dr. KUSHNER. Yes it certainly is and particularly because many of the people who we would bring to these programs come from the academic community. These people are generally available toward the end of the fiscal year, and it is at this time that the uncertainties with respect to the funding available for the coming year are most evident.

Mr. HANNA. There is one problem that has been pointed out by our staff, and that is that we do not in this committee as I understand it, Mr. Chairman, authorize appropriations for all of the NBS programs?

Mr. DAVIS. No indeed.

Mr. HANNA. And would this—

Mr. DAVIS. I might say to that of course NBS being under the Secretary of Commerce puts in a different light than most of the other committee work which is over at NASA an independent agency and NSF which is independent so it does put the NBS in a different category than the rest of our committee work puts in.

Mr. HANNA. Has that problem been thoroughly explored in relation to this amendment of the organic act?

Are we likely to run into some problems of giving a blanket authorization for multiple year appropriations in our bill, whereas it would apply then to areas of NBS over which we have no jurisdiction?

Dr. KUSHNER. Mr. Hanna, if I can interject here.

Mr. DAVIS. Go ahead.

Dr. KUSHNER. As I understand it, the final decision as to whether an appropriation is to be limited to one, two or any number of fiscal years is a decision that is made when the appropriation is enacted. What we are seeking here is only the authorization for multiyear appropriations to be made when the Appropriations Committee sees fit to so recommend.

Mr. HANNA. I am just wondering if we aren't still in the problem of authorizing something over which we have no jurisdiction.

Mr. DAVIS. No not that. No, the jurisdiction or the committee jurisdiction of NBS was definitely placed solidly under our committee, we are not in that position at all.

Mr. HANNA. All right.

Mr. DAVIS. And in connection with a continuing authorization, it reminds me of an old saying that we had in law school that a spring can flow no higher than its source, we can take back the authorization any year we wanted to.

Mr. BOONE. Mr. Davis, if I may, I think the question really has more to do with the appropriation since for example Interstate and Foreign Commerce authorizes appropriations for certain programs of the Bureau.

Mr. DAVIS. That is right, it does.

Mr. BOONE. So if we were to act here saying for all NBS programs, we might be as Mr. Hanna says, overstepping our jurisdiction.

Now it could be appropriate for the committee to take their action on fire research and technical data but I wonder if that would apply to the Flammable Fabrics Act.

I am sure that you hope it might, but would we really be in order to do that and I wonder if the legal counsel has thought about that aspect of it or made a study and——

Dr. KUSHNER. May I turn to Mr. Walleigh for some assistance on this matter?

Mr. WALLEIGH. I don't know that I can speak to this point. I had understood that this committee had the general oversight responsibility for the National Bureau of Standards.

Mr. DAVIS. That is true.

Mr. WALLEIGH. It is our understanding that the oversight committee would have authority to authorize multiyear appropriations for the functions which it oversees.

Mr. DAVIS. I really don't foresee much of a problem there. It wouldn't hurt to discuss it, of course, but I really just don't see much of a problem.

As I take it the fear that occurred to you that there might be a redundancy of authority between the Interstate and Foreign Commerce?

Mr. HANNA. Yes.

Mr. DAVIS. Well, the authority that you questioned before about would always come before this committee if it was an authorization for appropriations and the Appropriations Committee might have to distinguish between the two, but I just don't believe we will have any problem.

Dr. KUSHNER. This authority would be applicable to appropriations made to NBS for activities authorized under its organic act. It would not apply to those activities that are authorized under other specific pieces of legislation such as the Flammable Fabrics Act.

Mr. BOONE. I think that clarifies it. If that is true then there is no problem.

Dr. KUSHNER. We are requesting an amendment to the NBS Organic Act so that appropriations to carry out the provisions of that act may remain available beyond one fiscal year.

Mr. BOONE. I am of the opinion that the Fire Research and Safety Act is also an amendment to the basic act, so it is now part of the basic act. I don't know about the Flammable Fabrics Act.

Mr. HANNA. Well, I think we have flushed out that problem sufficiently that I think we can probably move ahead with not too much temerity.

You say on page 12 relating to this other amendment to allow the Bureau's personnel to do part-time teaching and training. Have you got any idea about how many of your staff would be involved in this kind of activity and how much total time might require for it?

Dr. KUSHNER. We don't envision that at any given time any more than a very small percentage of our staff would be engaged in this.

An indication of the magnitude of the activity is that at present the group of NBS employees that participate in the Joint Institute for Laboratory Astrophysics is approximately 20 technical people, but only a very small percentage of their time, something in the order of 10 percent, is devoted to teaching. Most of their time is devoted to theoretical or experimental research.

Mr. HANNA. By clarifying the Bureau's authority to allocate staff for this kind of thing, would you anticipate that this would substantially increase either the number of persons or percentage of their time?

Dr. KUSHNER. I think not, Mr. Hanna. We have as a result of administrative decisions participated in these arrangements in the past. We feel that it would certainly be helpful to us to have our authority to do this clarified, but we do not have a flood of potential arrangements that we would like to enter into immediately upon getting this clarification.

Mr. HANNA. Well, I think that is kind of helpful to get that in the record so that it is appreciated that what you want to do is to clarify what you are doing rather than to get an authorization to open up widely to do a lot more.

Dr. KUSHNER. Thank you.

Mr. HANNA. The other question I had is relative to this activity with foreign entities, I noticed on page 15 that you made it clear that any assistance that was given to commercial organizations of other nations they would pay for it just as the corporate entities in the United States do.

What about work done for agencies of other governments, would that be proposed to be at no cost or would it be proposed to fall under the same thing as you have for commercial organizations?

Dr. KUSHNER. In many instances our work with the governmental institutions of other nations would be on a reimbursable basis. In other instances, however, we might agree to a cooperative exchange arrangement in which we would perform some services for them and they would perform some services for us. In such cases we would expect to be fully repaid in kind.

Mr. HANNA. Well, I think that is important that you have that also on the record so that it is not indicated that you are going to use U.S. taxpayers money to do work for taxpayers of France or England for which they carry no burden.

Dr. KUSHNER. No sir.

Mr. HANNA. So I was anxious that you clarify that and get it on the record so we can make that clear.

I think that is all the questions I have, Mr. Chairman.

Mr. DAVIS. There is one area that has been of particular interest to me for some time and it is a little beyond the flammability in material research and that is the effect produced by the design of a building with respect to fire hazards.

I know that time and time again you read about a fire which revealed that a building was nothing much more or less than a chimney that just invited a strong updraft and I know that our building codes throughout the country are just a collection of all manner of varied concept of what a building ought to be like.

Do you have in your plans any studies that would go to the matter of building design?

Dr. KUSHNER. Yes, we do, Mr. Chairman. As you know the fire program at the National Bureau of Standards is an integrated program—one that involves a concern not only with flammable fabrics and the fire services, but also involves our work that is related to building codes and standards through our Building Research Division. We have very active programs that are concerned with providing safer design criteria for the architects and designers to incorporate in their specific building designs. We are very much aware of the total systems problems in dealing with fires in buildings and other structures and we are, I think, taking effective steps to see that the results of

our work are appropriately transferred to the working professionals in the field.

Mr. DAVIS. In doing research on fires in buildings, isn't it almost essential or isn't it essential that you create a fire in a building to see what happens when a fire gets in a building?

Dr. KUSHNER. Yes, sir; in the long run there is really no substitute for a fairly large scale test. On the other hand, there is a lot that could be learned with considerably less expenditure if we can successfully learn how to model fires so that we can perform the experiments on scaled down models in a laboratory. Even then no program would be complete without plans for some large scale burns.

Mr. DAVIS. I agree with that a hundred percent. It just occurs to me for example that you would never learn much about what it would take to set a big log on fire by using a toothpick as a model, it just wouldn't give you the same answer.

Dr. KUSHNER. Very well said, Mr. Chairman.

Mr. DAVIS. We don't have a minority member here this morning and I hesitate to take any committee action in the absence of one.

By the way, the reason I was late this morning; the committee and the consultant chairman had to go before the House Administration Committee in much the manner of which the people come before this committee, we were seeking funds to operate our committee this morning. So we were having problems over there we didn't have a minority member over there and I know we don't have one here.

I have no further questions about this bill. Mr. Boone, do you have anything that you would like to go into?

Mr. BOONE. We do need the 5-year funding projection if you will allow me to work with them.

Mr. DAVIS. Fine. And I assume there is nothing you would like to add.

(The 5-year funding information is as follows:)

STANDARD REFERENCE DATA PROGRAM—5-YEAR PROJECTION ¹

[In thousands of dollars]

	Fiscal year—				
	1973	1974	1975	1976	1977
Data evaluation:					
In house.....	1,200	1,200	1,200	1,200	1,200
Contracts.....	1,000	1,000	1,000	1,000	1,000
Total.....	2,200	2,200	2,200	2,200	2,200
Data systems and design: In house.....	116	116	116	116	116
Information services: In house.....	100	100	100	100	100
Management:					
In house.....	338	338	338	338	338
Contracts.....	41	41	41	41	41
Total.....	379	379	379	379	379
Summary:					
In house.....	1,754	1,754	1,754	1,754	1,754
Contracts and grants.....	1,041	1,041	1,041	1,041	1,041
Total.....	2,795	2,795	2,795	2,795	2,795

¹ These estimates represent simple projections of cost expressed in constant dollars at prices existing at the time the estimates are prepared. They are not intended to predict future economic conditions, and do not reflect possible changes in the scope or quality of the proposal which might result from experience gained in actual practice. Further, the resources which might appropriately be applied in later years will require a reexamination of the relative priorities of this and other Government programs, in the light of economic and other circumstances then prevailing. Thus, the estimates do not represent a commitment as to amounts to be included in future budgets.

FIRE RESEARCH AND SAFETY PROGRAM—5-YEAR PROJECTION¹

[In thousand of dollars]

	Fiscal year—				
	1973	1974	1975	1976	1977
Fire prevention:					
In house.....	224	224	224	224	224
Contract.....	1,100	1,100	1,100	1,100	1,100
Total.....	1,324	1,324	1,324	1,324	1,324
Automatic control and building safety equipment:					
In house.....	108	108	108	108	108
Contract.....	500	500	500	500	500
Total.....	608	608	608	608	608
Fire services:					
In house.....	363	363	363	363	363
Contract.....	1,400	1,400	1,400	1,400	1,400
Total.....	1,763	1,763	1,763	1,763	1,763
Research:					
In house.....	316	316	316	316	316
Contract.....	252	252	252	252	252
Total.....	568	568	568	568	568
Information and data:					
In house.....	117	117	117	117	117
Contract.....	548	548	548	548	548
Total.....	665	665	665	665	665
Summary:					
In house.....	1,128	1,128	1,128	1,128	1,128
Contract.....	3,800	3,800	3,800	3,800	3,800
Total.....	4,928	4,928	4,928	4,928	4,928

¹ These estimates represent simple projections of cost expressed in constant dollars at prices existing at the time the estimates are prepared. They are not intended to predict future economic conditions, and do not reflect possible changes in the scope or quality of the proposal which might result from experience gained in actual practice. Further, the resources which might appropriately be applied in later years will require a reexamination of the relative priorities of this and other Government programs, in the light of economic and other circumstances than prevailing. Thus, the estimates do not represent a commitment as to amounts to be included in future budgets.

Dr. KUSHNER. Thank you, I have had adequate opportunity.

Mr. DAVIS. Thank you and we will recess the committee at this time until the further recall of the Chair.

(Whereupon, at 11 a.m., the committee was adjourned.)



A11600 766805

