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FIRE RESEARCH AND SAFETY ACT OF 1968

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HEARINGS BEFORE THE SUBCOMMITTEE ON THE NATIONAL BUREAU OF STANDARDS OF THE COMMITTEE ON SCIENCE AND ASTRONAUTICS U.S. HOUSE OF REPRESENTATIVES NINETY-FIRST CONGRESS

SECOND SESSION

ON

H.R. 16538

APRIL 22, 1970

[No. 18]

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FIRE RESEARCH AND SAFETY ACT OF 1968

WEDNESDAY, APRIL 22, 1970

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE AND ASTRONAUTICS,
SUBCOMMITTEE ON THE NATIONAL BUREAU OF STANDARDS,
Washington, D.C.

The subcommittee met, pursuant to notice, at 10 a.m., in room 2325, Rayburn House Office Building, Hon. John W. Davis (chairman of the subcommittee), presiding.

Mr. DAVIS. The meeting will come to order.

Dr. Branscomb, of course we know that you are here to testify about the fire safety bill, the Fire Research and Safety Act of 1968, as it is known; and without further ado, I will ask that you just go ahead and make your presentation.

(H.R. 16538 follows:)

[H.R. 16538, 91st Cong., second sess.]

A BILL To authorize appropriations to carry out the Fire Research and Safety Act of 1968

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there are authorized to be appropriated to the Department of Commerce such sums as may be necessary for the fiscal years of 1971 and 1972, but not to exceed a total of \$5,000,000, and such sums as may be necessary for succeeding fiscal years to carry out the purposes of the Fire Research and Safety Act of 1968 (Public Law 90-259; 82 Stat. 34).

Without objection I will insert the biographies of Dr. Lewis M. Branscomb and Dr. John A. Rockett at this point.

(The biographies follow:)

DR. LEWIS M. BRANSCOMB

Dr. Lewis M. Branscomb has been Director of the National Bureau of Standards, U.S. Department of Commerce, since September 1, 1969.

Born in Asheville, North Carolina, on August 17, 1926, Dr. Branscomb was educated at Duke (A.B., 1945, summa cum laude) and Harvard Universities (M.S. 1947, Ph. D. 1949). After holding a Public Health Service fellowship, he was a Junior Fellow in the Harvard Society of Fellows (1949-51). Since then Dr. Branscomb has also taught at University College, London, the University of Maryland, and the University of Colorado, where he was a Professor Adjoint of Physics.

He joined the National Bureau of Standards in 1951 after finishing his formal education. For ten years he directed the Bureau's work on atomic physics, and for eight years he was chief of the NBS Laboratory Astrophysics Division in Boulder, Colo., a unit of the Joint Institute for Laboratory Astrophysics (JILA) of which he was chairman. JILA is a noteworthy cooperative venture between NBS and the University of Colorado. Dr. Branscomb was instrumental in the formation of JILA.

Dr. Branscomb was until recently a member of the President's Science Advisory Committee and the only working scientist ever to be selected from the staff of a directly operated Federal laboratory to serve on that committee.

The National Civil Service League, in selecting Dr. Branscomb as one of the ten recipients of its Career Service Awards in 1968, cited him in particular for his demonstrated ability "to smooth the interaction of technology and our society," and for his contributions to the evaluation and planning of U.S. scientific programs and politics affecting national defense, space, and atomic energy.

This award to Dr. Branscomb followed many others, including the Rockefeller Public Service Award, 1957-58; a Gold Medal for Exceptional Service, Department of Commerce, 1961 (for contributions to basic knowledge of atomic processes of stellar atmospheres, terrestrial ionosphere and interplanetary space); the Arthur Flemming Award, District of Columbia Junior Chamber of Commerce, 1962; and the Samuel Wesley Stratton Award (named for the first director of the National Bureau of Standards), Department of Commerce, 1966.

Dr. Branscomb serves as a special consultant to the Secretary General of the Organization for Economic Cooperation and Development on matters of scientific and technical information.

The international scope of Dr. Branscomb's achievements is further indicated by his participation over the years in the work of three scientific unions: the International Union for Geodesy and Geophysics, the International Union of Pure and Applied Physics, and the International Astronomical Union.

Prior to his current position as Editor for *Review of Modern Physics*, he was Chairman of the Division of Electron and Atomic Physics of the American Physical Society.

Dr. Branscomb is married to the former Anne Wells of Milledgeville, Ga., an attorney. They have two children, Harvie and Katharine.

DR. JOHN A. ROCKETT

Dr. Rockett as Chief of the Office of Fire Research and Safety is charged with planning implementation of the Fire Research and Safety Act of 1968, PL 90-259.

Before joining the National Bureau of Standards' staff in September 1968, Dr. Rockett was Director of Basic Research for the Factory Mutual Engineering Association. His group did fundamental studies on flame spread, fire induced convective air movements in buildings and applied research on the prediction of growth and spread of building fires.

In 1944 Dr. Rockett received a B.S. degree in Marine Engineering from the Massachusetts Institute of Technology. After two years in the U.S. Navy during World War II doing radar repair, he joined the Langley Laboratory of NASA working on a high speed seaplane project. He studied mathematics and aerodynamics at Brown University and the Eidgenossische Technische Hochschule in Zurich, Switzerland receiving the M.S. degree from Brown in 1951. From 1950 until 1954, he did aerodynamic research for the MIT Aeroelastic Laboratory. He obtained a Ph.D. degree from Harvard University in 1958 in Applied Physics where he had performed research in Combustion and Non-Steady Aerodynamics. Dr. Rockett joined Pratt & Whitney Aircraft in 1957. He worked on company sponsored research at Harvard in Compressor Stall and later his group did research on Plasma Physics, Solid State Thermoelectric devices and Electrochemistry. He organized their Applied Physics laboratory in East Hartford. As Chief of Fuel Cell technology from 1963-66, he participated in the development of the Fuel Cell as a practical high-efficiency source of electric power.

STATEMENT OF DR. LEWIS M. BRANSCOMB, DIRECTOR, NATIONAL BUREAU OF STANDARDS, ACCOMPANIED BY DR. JOHN ROCKETT AND ALLEN FARRAR

Dr. BRANSCOMB. Thank you very much, Mr. Chairman. First I would like to introduce my colleagues—Dr. John Rockett, who is in charge of our Fire Research and Safety Office, and Mr. Allen Farrar, the Bureau's legal adviser.

I am pleased to have the opportunity to appear before the subcommittee today to discuss the Fire Research and Safety Act of 1968. We are here to urge enactment of H.R. 16538 that would authorize appropriations to carry out the purposes of that important piece of legislation.

The act of 1968 authorizes the establishment of a comprehensive fire research and safety program to attack the problem of unwanted fires in which 12,000 people are killed each year, many times that number painfully injured, along with several billion dollars of property damage.

Surely, this is a problem that demands attention, and we believe that the Fire Research and Safety Act is a proper legislative response to this problem. Unfortunately, as I will explain later, we have not yet been able to launch the program authorized by the act because of financial limitations.

Today, I will discuss the current work of the National Bureau of Standards that is directed at fire problems and the new programs we plan to initiate if the authorization you are considering is approved and funds are appropriated.

These proposed programs are in response to title I of the act which states that it is the sense of Congress that there should be a Fire Research and Safety Center to provide more effective measures of protection against fire hazards. This Fire Research and Safety Center would engage in activities such as:

- (1) The gathering of comprehensive fire data;
- (2) A comprehensive applied research and development program;
- (3) Fire safety education and training programs; and
- (4) Demonstrations of new approaches and improvements in fire prevention and control.

The goal of the Center would be to reduce death, personal injury, and property damage. In carrying out the provisions of this title, we will cooperate with and assist public and private agencies.

The act specifically authorized the appropriation of \$5 million for work of this nature during the first 28 months following its enactment in March 1968.

The nature and scope of the fire problem was thoroughly discussed before this committee 3 years ago, when the act was first being considered. To give perspective to the statistics presented in those hearings, let me now compare the problem of fire in this country with problem of crime.

In 1967 there was about 12,200 deaths due to fire, compared with about 13,100 murders. The \$2.5 billion reported property losses from fire is greater than the \$1.5 billion for crime, and we believe the unreported losses are also comparable.

The \$3 billion cost of operating police departments is only 15 percent greater than the cost of operating fire departments. And we believe the fireman's job is as dangerous as that of the policeman.

Risk of death from fire strikes cruelly at the very young and the very old. A child under 3 and a man over 70 are three and a half times as likely to die in a fire than a woman of 20. The poor are more vulnerable than those of adequate means; our black citizens are three to four times as likely to perish in fire than are whites—an indication of the seriousness of fire risk in the inner city. Of all our citizens the poor, the old, and the very young are particularly deserving of the concern of Government.

The National Bureau of Standards has been concerned with the problem of unwanted fires for 65 years. Back in 1904, 70 blocks of downtown Baltimore were gutted by fire. Fire departments from miles around

came to help—even as far away as New York City—only to find their hoses could not be connected to the Baltimore hydrants because there were no accepted standards for the diameter and screw thread of the couplings.

Soon after this fire, the Bureau, working with the National Fire Protection Association, developed standards that now permit interchange of hose among all fire departments which have adopted the standard.

Since 1914 the Bureau has conducted a small program of applied fire research, and has been developing procedures for measuring the fire resistance characteristics of building materials and building components.

These test methods have been adopted by private organizations—such as the American Society for Testing and Materials—for incorporation into voluntary standards that are used by industry in buying and selling building materials. Such standards are really the language of the marketplace: they permit builders to specify the fire resistance characteristics of the materials they use in construction of buildings.

The tests are also used in the development of building codes which insure that buildings are constructed with an acceptable level of fire resistance characteristics and materials.

It should be noted that the National Bureau of Standards does not set the standards nor write the building codes; its role is to develop the technical knowledge and test procedures which industry may use in establishing voluntary standards, and which State and local governments may use in issuing mandatory building codes.

Mr. DAVIS. May I interpose a question right there?

Dr. BRANSCOMB. Yes, sir.

Mr. DAVIS. Has there been any research as respects the National Bureau of Standards regarding the spread of fire due to—let's say elevator shafts and open windows and things of that kind? The difference it might make if you had a firewall in a hotel building, for example.

Dr. BRANSCOMB. Yes, sir. That is the kind of concern that our building research division has given to the problem of fire in buildings. This has not, however, been an effort that we have been able to give a lot of detailed attention to, and this is part of the program that we would like to expand in the future.

I don't know whether you would like to comment more specifically, John.

Dr. ROCKETT. One of the problems with this type of thing is that as the building ages, the imperviousness of the firewall is compromised by various building modifications and maintenance procedures and so on.

Most of the work that has been done to date has dealt with the fire resistance of buildings as they are supposedly built. The fire marshall and the fire chief who fight the fire and later investigate it have to deal with the building as it is when the fire occurs, and there are sometimes large differences.

This area, except for the intuitive knowledge of the fire investigators, and so far as they can get their view reflected in codes, is not something that we can quantitatively assess at this point.

Mr. DAVIS. I can think of a number of examples. For example, the famous Winecoff Hotel fire in Atlanta in the early 1950's, as I recall.

And there was a far more recent one in Montgomery, Ala., in a restaurant which was on the top floor of the building, and the fire, as I recall, cut off the elevator shaft and rendered the elevator unusable, and I forget how many people lost their lives in that restaurant.

It is a very serious problem, I know. I can conceive, however, that the problem of entering into the applied research in that field would be considerable. I don't know whether you could use models or not, like you do in wind tunnels.

Dr. ROCKETT. You can use models. One has to be careful what you mean by the term "model." But yes, you can, and this is one of the areas where we need to do a great deal more work, to learn how to translate what we learn from the model into what we need to know in the building.

Mr. DAVIS. I see.

Dr. ROCKETT. Howard Emmons discussed that quite extensively in his testimony before the committee in 1968.

Mr. DAVIS. All right, sir. Thank you.

Dr. BRANSCOMB. The Bureau also has a program concerned with the flammability of fabrics. In 1967, Congress amended the Flammable Fabrics Act of 1953. This amendment gave the Secretary of Commerce the authority and responsibility for the first time to issue mandatory standards for fabric flammability, including wearing apparel and interior furnishings.

The National Bureau of Standards is responsible for the technical aspects of this program, such as developing the test procedures that are incorporated in the standards. This is an important Bureau program in the fire field, but its appropriation is authorized by a separate act—the Flammable Fabrics Act—and the work is directed to a highly specialized purpose.

The Fire Research and Safety Act of 1968 gave the Bureau of Standards new authority and responsibility in the fire field. The new programs would be, however, a natural extension of our existing activities; the experience we are obtaining, and the competence we are developing will be invaluable when we develop new programs in response to the act.

Soon after the passage of the Fire Research and Safety Act of 1968, the National Bureau of Standards prepared a program plan for establishing the Fire Research and Safety Center authorized by the act. I will return to this plan later in my testimony.

Unfortunately, this plan has not been put into effect, and the Fire Research and Safety Center has not been established, because adequate funding has not been available. I will summarize the budget history briefly:

The Fire research and Safety Act was enacted in March 1968, too late for its funding to be included in the regular appropriation request for fiscal year 1969. A revised request was submitted in time for consideration by the Senate, which recommended an increase of \$500,000 "to finance the Fire Research and Safety Act of 1968," but this increase was not included in the appropriation that finally was approved in the conference.

Funds to implement the program were again requested for fiscal year 1970. The appropriation that was finally approved provided only \$550,000 for all of the Bureau's program increases, including the ur-

gently needed expansion of the flammable fabrics program which had been established in response to the 1967 amendments to the Flammable Fabrics Act.

It, therefore, was not possible to initiate new programs in response to the even broader Fire Research and Safety Act of 1968.

Again, for fiscal year 1971 the President has requested an increase of funding in the amount of \$1.11 million specifically for initiation of tasks authorized by the Fire Research and Safety Act.

The proposed reauthorization is for an expenditure of \$5 million for the next 2 fiscal years. This would permit a rapid but prudent growth in the Bureau's fire programs. During hearings on the Fire Research and Safety Act of 1968, there appeared to be general agreement that the program ultimately should be funded at a level of about \$10 million annually to be fully effective.

I would like to assure you that, although I have referred separately to ongoing building fire studies, the flammable fabrics program and proposed new fire programs, all fire research programs at the National Bureau of Standards are and will continue to be coordinated.

I have discussed these programs as separate entities in order to make clear that we have active and growing programs in fire research that are not covered by the legislation under consideration. All these fire programs are now part of the Bureau's Institute for Applied Technology located at Gaithersburg, Md.

All special laboratory facilities such as fire test furnaces are shared where appropriate, and any new facilities will be designed to meet the collective needs of the program. When the Fire Research and Safety Center is organized, it will coordinate all three programs.

Let me now turn to how the National Bureau of Standards plans to respond to the responsibilities and authorities of the act if the Congress authorizes and appropriates funds. The act authorized the Secretary of Commerce to conduct, directly or through contracts or grants, the following:

1. Investigations of fire causes, severity, frequency, or other pertinent factors;
2. The development of improved methods and techniques for fire prevention, fire control, and reduction of death, personal injury, and property damage;
3. Educational programs to inform the public of fire hazards and fire safety techniques, and to encourage the avoidance of such hazards;
4. Fire information reference services, including the collection, analysis, and dissemination of data and research results related to fire protection, control, and reduction of deaths or property loss;
5. Educational and training programs for the improved efficiency, operation and organization of fire services; and
6. Demonstration projects in support of fire prevention, fire safety principles in construction, and improved fire services.

Further, the Secretary is to support the development of fire safety and protection engineering or science curriculums; and fire safety courses, seminars, or other instruction materials and aids for courses of instruction.

The need for these programs to cut our Nation's terrible fire losses is clear. The question is, How do we undertake them in such a way that

they supplement and encourage existing private, State, and local programs?

The job is so big that all possible resources should be directed toward the problem, and the Federal investment should stimulate increased private effort. We will not be meeting the need if Federal efforts merely replace private or local government activities.

However, we can meet the need if we provide leadership, coordination, encouragement, data, and information that increase the value and efficiency of the efforts of all groups.

As I mentioned earlier, we have prepared a program plan for conducting our fire research and safety program. Copies of this plan have been made available to this committee. I would like only to refer to some of its highlights.

Our program is addressed mainly to the varied aspects of urban fires: Those which occur in built-up areas and are, therefore, principally in buildings and structures. Other types of fires tend to be covered by existing Federal programs.

For example, the Forest Service of the Department of Agriculture has a successful program concerned with forest and brush fires, and the Department of the Interior is concerned with fires in mines.

It is necessary to know why and how the heavy fire losses are occurring. We must support projects that will upgrade the accuracy and comprehensiveness of fire data, so that our programs can be based upon a factual examination of what the problem really is.

Thus we expect to be able to pinpoint those areas having the greatest need for corrective programs. The immediate objectives of the data gathering programs would be to:

1. Determine the number of people injured by fires, who they were, what kind of place they lived in, what they were doing, when they were injured, what fire warnings and services were available;
2. Determine the fire environment which caused the injury; that is, how and why they were injured, what affected their safety, what failure led to their injury; and
3. Determine the availability of fire protection measures and their effectiveness and reliability when available.

These statistical studies would be given high priority in the early stage of program development, since they provide a basis for setting priorities for other parts of the program.

The National Fire Protection Association (NFPA) presently conducts the major U.S. program in compilation and analysis of fire loss data. It acts as a clearinghouse for information on fire prevention and protection. NFPA relies heavily on voluntary data submission, and performs admirably within the limits of its relatively small budget.

However, the incompleteness of their data is a major stumbling block. The Center will support data gathering projects to supplement the current activities of the NFPA. NFPA would be well qualified to conduct these projects for us.

Second, strong emphasis will be placed on the needs of local fire departments. The cost of operating fire departments is a major item in the total costs of fire. An increase in the effectiveness of the fire service in rescue, fire prevention, and fire control should cut deaths, injuries, and property damage.

The program should provide a mechanism through which fire officers could be given temporary work assignments in the Fire Research and

Safety Center. This would provide a vehicle to establish close liaison with the fire services, both to bring their problems into the Center and to insure applications in fire departments throughout the country of the solutions worked out.

Some of our highest priority items in assisting the fire services involve the development of improved equipment for controlling fires and safer and less restrictive protective clothing and equipment for firefighters.

I want to make it clear that it is our intention to stimulate and strengthen the research and development capability of the fire equipment industry. We plan to work on problems where industry has not shown an interest or capability.

The National Safety Council has found that, next to mining and quarrying, firefighting is the most hazardous of all the occupations they have surveyed. Firemen must be provided better protective equipment. A better breathing mask has been identified by the fire services as their No. 1 priority for improvement.

The act authorizes the development of curricula and educational materials for fire safety and fire engineering courses. The fire services need these courses. The Center will work with the national fire service organizations and the educational community toward this goal. It will develop new and improved courses and educational materials.

Third, the research activities of the Center will be concentrated on studies of the growth and spread of fire in a building. There is immediate need for techniques which will permit accurate prediction of the course of a fire in a specific building with a given occupancy.

I might comment parenthetically, Mr. Chairman, that this refers to the very problem you identified in your earlier question.

Mr. DAVIS. I see.

Dr. BRANSCOMB. Present techniques are not satisfactory. The lack of appropriate predictive methods inhibit attempts at practical, scientific solutions to fire problems. An immediate goal of this study is to help the fire chiefs tell who is in danger, how much equipment he needs, and what is the best strategy for fighting a particular fire.

The act refers to educating the public about fire hazards and fire-safety techniques. This is currently being done on a limited scale by private organizations. A large new program of this type could be quite expensive.

During the past year, the fire services have developed a heightened awareness of the importance of public education as it affects fire department-public cooperation. Out of this have come some apparently very effective programs directed at this specific objective.

Building on this base, the Center would concentrate first on establishing a method for evaluating educational programs. One or two pilot projects directed at less than 1 percent of the population would be developed, implemented, and evaluated against controls. On this basis, a decision could be made about further programs.

Inexpensive and reliable fire detection devices are needed. Fire deaths occur predominantly in buildings where people are sleeping during the night. The victims are asleep when the fire occurs, and have insufficient warning of danger.

Automatic fire detection and alarm is an obvious, and perhaps the only solution to this warning problem. The challenge is to foster the

development of a very sensitive, highly reliable, inexpensive detector which requires little maintenance.

The center should establish a sound technical means for evaluating detectors and their installation. Smoke and toxic gas studies now being conducted at the National Bureau of Standards should play a role in both developing criteria for the detector itself, and determining the conditions which lead to the development of excessive concentrations of toxic gases.

Very little work has been done in applying the techniques of operations research to the fire problem, and the Center would support projects in this area. It can provide information that helps local governments achieve more efficient services to their citizens, with the objective of either cost savings or improved service for the same cost.

I can illustrate the use of operations research by describing a project that the Bureau has completed in cooperation with the city of East Lansing, Mich., and the International City Management Association.

East Lansing needed to replace a downtown firehouse, and build additional firehouses to serve its expanding population. The city government needed to determine the number and optimum location of the new firehouses required.

The locations of the facilities depended, in part, on the average time needed for fire engines to get from the firehouse to the various areas to be protected—not just for this year, but for 5, 10, 15 or more years in the future.

We modified an existing computer program that had been developed at the Bureau for the Northeast Corridor Transportation project so that it could be used by East Lansing to solve its problem.

It was found that only one additional firehouse was needed, instead of two that had previously been thought necessary. This information saved the city both construction and administrative costs.

The city, using the computer program, developed the configurations to be evaluated, ran the program, and acted upon the results. East Lansing is now using the same computer program in choosing among specific sites that are available for purchase. We provided the tools for the city; they are making their own decisions.

The last part of our proposed program that I wish to discuss is the information service. This would not be a passive service or a simple repository, but an active program that would help guide, coordinate and support the national attack on fire loss.

It would place needed information in the hands of fire chiefs in a form specifically tailored to their needs.

It would prepare and distribute statements of critical problems requiring solution and show their relevance to other problems and issues. There would be no compulsion on other groups to work on these problems, but the facts presented would affect project selection and help avoid unwanted duplication. Of course, we would have also an extensive reference library that would be available to all groups working on the fire problem.

A budget summary is included with this statement. The amounts shown for fiscal year 1971 are included in our appropriation request that is now before the Congress.

DEPARTMENT OF COMMERCE, NATIONAL BUREAU OF STANDARDS
FIRE RESEARCH AND SAFETY ACT—PROPOSED DISTRIBUTION OF FUNDS BY PROGRAM AREA

[In thousands of dollars]

	Fiscal year 1971			Fiscal year 1972 ²		
	In-house	Contract	Total	In-house	Contract	Total
Existing programs ¹ -----	391	18	409	391	49	440
New programs:						
Research-----	348	117	465	648	810	1,458
Information and reference services-----	130	240	370	333	412	745
Education and training-----	140	135	275	313	525	838
Totals-----	1,009	510	1,519	1,685	1,796	3,481

¹ Does not include flammable fabrics activities.

² Fiscal year 1972 estimates have not been reviewed or approved by Department of Commerce or Bureau of the Budget.

It should be understood, however, that the fiscal year 1972 figures are only estimates of the support needed for optimum development of the program, and that these estimates have not been subjected to final budgetary review and approval by the Department of Commerce or the Bureau of the Budget.

A major part of the proposed program expansion would be accomplished through contracts. Although we plan to develop and maintain a strong in-house program, a large amount of contract activities will be a permanent characteristic of the program.

I have discussed the current fire programs at the National Bureau of Standards, and briefly have outlined some of the new programs that we would initiate if funds are authorized and appropriated.

We believe that this program will supplement and support existing programs, and encourage expansion of existing private and public activities related to fires and their prevention.

Private sector and State and local government efforts have accomplished a dramatic reduction of fire loss rates in this country over the last hundred years. The cities, counties, and States; the professional fire service organizations; the insurance companies and safety test laboratories; the other agencies of the Federal Government all have essential jobs to do if we are to bring about a substantial improvement in this still serious situation.

With the substantial annual investments whose authorization we request—still only one-tenth of 1 percent of what the Nation spends on fire fighting services—the Department of Commerce can catalyze this national effort and help to mobilize the ingenuity and determination of Americans everywhere to reduce this terrible loss.

We at the National Bureau of Standards would like to get on with the job.

Thank you, Mr. Chairman.

Mr. DAVIS. Thank you very much.

Do either of you gentlemen have any questions?

Mr. HINES. Yes, sir, I have one question, Mr. Chairman.

Mr. DAVIS. Go ahead.

Mr. HINES. Thank you, sir.

Dr. Branscomb, you mentioned the hazards that are experienced by firemen, and so forth. Would you anticipate a program which would research for information that could be applied for providing effective devices?

I refer to NASA. They have done a lot of successful work in providing equipment to protect people. Would the center undertake such a task?

Dr. BRANSCOMB. Yes, sir, the center would undertake the task of trying to improve the development of protective and warning devices that are of the type that are applicable to the problem of the everyday citizen.

I think that as we look into this question, we will find that some very useful and important scientific and technical work has been done by NASA and other organizations. Indeed, we know we will find that there is extensive work that's been done in the private sector to protect major industrial configurations and plants.

I think our special problem is to find how this technology can be adapted to the economic requirements of the protection of the average citizen throughout the country.

Mr. HINES. I would suggest, too, the industry could be very helpful in that regard, in getting the cost of such applications down to a reasonable level.

Dr. BRANSCOMB. I think that is right. One factor in that cost reduction must surely be a national coordination of the interests and the needs of the fire jurisdictions throughout the country on the local level, so that when a new technology does come out that is effective and cheap, there will be a national market for it. I think that is an essential part of the problem.

Mr. HINES. Thank you.

Thank you, Mr. Chairman.

Mr. BOONE. Mr. Chairman, I want to raise a couple of questions here that might be asked on the floor.

Mr. DAVIS. All right.

Mr. BOONE. Is there something inherent in this Fire Research and Safety Act that is not included in your existing program. In other words, do you need this additional authorization or justification for doing this work?

Dr. BRANSCOMB. Most emphatically the answer is "Yes." The present, basic, statutory authority of the National Bureau of Standards does permit us to look at the measurement problems and the codes and standards problems that relate to fire. Our existing activity is concerned with insuring that our total understanding of how building codes can be improved does make adequate allowance for the very great importance of fire as an element in deciding how a building system should be evaluated.

But the Fire Research and Safety Act gives us the mandate to undertake not just a research and development program, but a total program that is appropriate for the Federal role in this cooperative endeavor. It includes educational activity, training activity, operations research activity, research, information services, and a variety of things quite specifically delineated in the act, that are part of a strategy designed in the law for attacking the total problem of reducing fire deaths.

Our objective under this legislation will be to try to increase the safety of the average American living in his home. The act makes it clear that we are not limited to what might otherwise be viewed as a somewhat narrower and constrained mission with respect to the integrity of measurements applied in this area and others.

Mr. BOONE. May I continue, Mr. Davis?

Mr. DAVIS. Yes.

Mr. BOONE. On page 14 of your statement, you say "a better breathing mask has been identified by the fire services as their number one priority for improvement" Now, is this the sort of thing that you would develop? Why do not the existing organizations go ahead and develop such a requirement, if there is an obvious need?

For example, I am thinking of the mine safety people, and others, who also have considerably larger sums available. And if it is that apparent, why, it seems to me somebody is remiss.

Now, the first question that is going to be asked is, can you coordinate this effort? Is it your job to coordinate the effort between the various agencies of the Federal Government, to see that you are not duplicating?

Dr. BRANSCOMB. You have asked two questions. Let me try to answer both of them.

First, with regard to the breathing mask, I think the question you raise beautifully illustrates the problem we face. It is my understanding—Dr. Rockett can correct me if I'm wrong—that the present mask that is manufactured for and used largely by fire services was developed as a consequence of the interest of the Department of the Interior in mine safety. That was its basic purpose.

The requirements for mine rescue are very specialized and differ from the problem of fighting fires in houses, in small towns, and big cities. And, in fact, this mask is found unsuitable, or at least not ideally suited to the requirement of firefighting in the urban situation.

I think our opportunity in a case like this is to take the investment that has been made already, and is continuing to be made for special purposes such as mine safety, and to find the cheapest and easiest way that it can be adapted to the general needs of the public.

I believe it is again a case of insuring that the technology that the Federal Government has mobilized to meet special Federal goals is properly made available to meet the average citizen's needs.

Now, with respect to our ability to coordinate the program, I think that ability will primarily stem from the quality of our technical performance in carrying out the act, rather than any special authority given us to coordinate within the Government.

However, there are mechanisms for carrying out that coordination. There is a Federal Fire Council, on which I sit, and it is a permanent and staffed instrumentality for bringing all of the interested parties in the Federal Government together to attack this problem.

I might also say that in preparing for our plans under this act, we have made every attempt to investigate the interests of other agencies, and to determine just how much we can expect from them toward a solution to this problem. We would like to get all the help we can.

Mr. BOONE. One last question, Mr. Davis, if I may.

Mr. DAVIS. All right.

Mr. BOONE. I believe in the previous testimony there were some remarks by the firefighters about having some input to influence your program. Do you think that the necessary organizations exist whereby you can get all the advice that is available from the active, everyday firefighter, to make your program a progressive one and a satisfactory one?

Dr. BRANSCOMB. I believe that we do have at the National Bureau of Standards all of the capability, if not actually existing mechanisms, advisory committees, and the like, to get that input.

Dr. Rockett has been in close contact with a large number of such organizations, and as you know, we have a substantial array of advisory committees that were established at our request by the National Academy of Sciences and the National Academy of Engineering.

Of course, we are not restricted to the use of those committees as our only source of advice. As I indicated, we expect to have practical, experienced, fire service people operating not only in an advisory capacity, but actually participating in the program personally. That is the best way to get their advice.

Mr. BOONE. Very good. Thank you.

Dr. ROCKETT. Could I add something?

Dr. BRANSCOMB. Mr. Chairman, may Dr. Rockett add something to that?

Mr. DAVIS. Yes; go right ahead.

Dr. ROCKETT. I do think we will have one problem, and this is getting adequate representation of the views of the volunteer firefighter. By far the largest number of fire companies and probably the largest number of firefighters are volunteers.

They have, partly from the very nature of the volunteer organization, very strong opinions, but not necessarily very strongly cohesive opinions of what they need. In bringing people into our center to work, it may be possible, with not too much difficulty, to get a paid firefighter from some larger community that has a fully paid staff assigned to temporary duty in our office; but to get a volunteer firefighter temporarily away from his job may require considerable preliminary work and effort on our part and on the part of the fire services. This is necessary so that we can bring these volunteer firefighter views in.

So I think this will be a most serious problem. It is one we are very well aware of, and the fire services are aware of it. We just don't know how we are going to get the most effective solution.

Mr. DAVIS. That brings to mind a situation that exists with respect to law enforcement. Of course, we have the Federal Bureau of Investigation, and we have—an academy, where the FBI agents are trained.

And then a program has been in force and effect for a number of years under which various police officers from the local communities are brought up and given something like a 6 weeks' course of training in the FBI Academy, and with the end result that you end up with a knowledgeable and fairly well-skilled law-enforcement officer.

I cannot construct in my mind a picture of that exact thing happening with respect to firefighting and prevention, but it would be a good concept, I might say, if we could work out a program under which, as some kind of honor to a firefighter—either volunteer or full-time salaried firefighter—if he could be allowed to come to Washington for a period of time, and receive an intensive course of training.

I think it would be well if we put some thought on that idea.

Dr. BRANSCOMB. We believe that this kind of organized training is a very important thing. There have been, in the past, a number of proposals not unlike what you are suggesting, and I think we will want to evaluate very carefully the best way for us to assist in this training program.

I suspect that evaluation should take place as we get into the question of what is the best kind of training, which is, as yet, not fully known.

Of course, there also is a difference between the fire problem and the crime problem, in that there is not a Federal role, a comprehensive national role in firefighting, as there is in Federal crime. Therefore, we don't have quite the analogy of the FBI in this case.

Mr. DAVIS. Right.

Chairman MILLER. Well, it is true you do not. On the other hand, this FBI school has set a standard for police departments throughout the country. They now have a common base to evaluate their activities from.

And I think the thing that Mr. Davis points out, you'd bring new techniques—particularly to smaller fire departments that haven't the opportunity of getting this—and I can conceive nearly every fire department I know wanting to send men, at their expense, just as the police come here, to send them here for maybe 3 or 4 weeks, just to learn the latest techniques in the business.

Dr. BRANSCOMB. That kind of a program is indeed in our plans.

Chairman MILLER. And the application of new things in firefighting, particularly the small communities do not get. I assume the fire departments in the metropolitan areas are all up to standard, but I know in some of the small, remote communities in California—maybe a few in Georgia—that they don't have an opportunity of getting these things. This would give them a great chance to do it.

Mr. DAVIS. To move on to a slightly different and more or less technical subject, I am sure that all of you gentlemen are aware of the revolution that's taken place in the field of floor and wall coverings.

There are different methods, such as woven rugs, flocked rugs, and other weave methods, and it has now got to the point that hardwood floors are almost passe, almost a thing of the past.

And I notice now that even builders are beginning to put up a cheaper plywood covering over the studs of a wall, and then cover that with—not exactly a carpeting, but a covering that's designed to be a wall covering.

Of course, it is quite economical. But I wondered if you would consider such soft floor coverings and wall coverings—they unquestionably are a part of the house—would you consider that a flammable fabric, or a material?

Dr. BRANSCOMB. I will agree that technology moves so rapidly that we may occasionally have difficulty with definitions. The Flammable Fabrics Act does provide a definition of a fabric that is really quite broad, and I suspect that if the material is used—

Perhaps I should refer here to Mr. Farrar, who can recall for me more precisely what the definition of a fabric is that's contained in the amendments to the act. The act is written quite broadly. It states:

The term "fabric" means any material, woven, knitted, or otherwise produced from or in combination with any natural or synthetic fiber, film, or substitute thereof. . . .

Mr. DAVIS. That would include flocking, you think? You know, flocking is done by using an electrical charge that makes this little fiber stand up straight, and then you glue one end of it to the base.

Dr. BRANSCOMB. I think it would be so construed. But the definition in the act also refers to the use of such materials. It applies to materials

intended for use, or which may be reasonably expected to be used, in any product that is in another section of the act referred to as an "article of wearing apparel or interior furnishing."

The question would also arise whether a wall is a furnishing. I would think perhaps it is not.

Mr. DAVIS. No.

Dr. BRANSCOMB. If it cannot be removed, for example, ample, an advertisement I got from Hechinger's, for carpeting, that comes in 18-inch squares. It has a semiadhesive, about like these adhesives that you use for putting a nameplate on your lapel. You can easily pull it off.

So that a tenant could put this down, then when he leaves, he could pull up his carpet and take it with him and put it down again. So I can see that you'd be pushed to decide whether that was a fabric or a part of the house, under many circumstances.

Well, to move on to another question.

I was interested in your Institute for Applied Technology. Now, that would seem to cover the waterfront. Are its functions as broad as its title? Institute for Applied Technology?

Dr. BRANSCOMB. Perhaps not, sir. I think its title should be interpreted with the knowledge that it is a part of the National Bureau of Standards. We assign to that institute those programs that deal primarily with manufactured articles, with the practical technological problems of codes and standards, as distinguished from—

Mr. DAVIS. That is still extremely broad, even considering that it is a part of the Bureau of Standards.

Dr. BRANSCOMB. Yes, sir, it is. I would have to admit that our function, as described in the Bureau's basic legislation, is a very broad function, and we have some difficulty in spanning the totality of those responsibilities.

Mr. DAVIS. Let's see. I had one or two other points.

Now, on page 10, down there in your subparagraph three, you say—

educational programs to inform the public of fire hazards and fire safety techniques, and to encourage the avoidance of such hazards.

Of course, that language is thoroughly understandable, inasmuch as it is a copy of the act.

Dr. BRANSCOMB. Yes, sir.

Mr. DAVIS. But it seems to me that really to head for the jugular, so to speak, in this situation, that it would be more effective if you could direct your initial efforts toward educating the entities of local government, who are empowered under the law to enact building codes.

And, of course, once a building code is enacted, then the public is going to fall in line, because it has no choice. And it would seem to me that that would be a good place to start, to really concentrate on the units of local government, and to see that sensible codes are adopted.

Do you agree with that?

Dr. BRANSCOMB. I absolutely agree with you. In fact, 3 years ago we took the initiative to organize a National Conference of States on Building Codes and Standards. This conference now exists with 38 States in attendance at the annual meeting, which occurred last week

in Wichita, Kans. Those States represent 85 percent of the population of this Nation.

That conference seeks the very objective that you describe, which is the improvement on a national basis of the ability of State and local government to deal effectively with the building code problem. The conference is intended to assist the States in providing improved protection for the public under circumstances where new kinds of materials and new kinds of buildings are being invented every day, some of which appear to violate existing codes, but may not necessarily result in bad buildings.

Second, it seeks to encourage efficient industrialized production of housing for the public. Obviously, in this program, the considerations of fire hazards play a major role.

Indeed, some of the Governors sent, as their representatives to this conference, their fire commissioners, rather than their State architect or other building official, so these two communities of interest are closely intertwined.

If I may, though, let me be sure that it is understood that the fire problem is much bigger than the building code problem.

Mr. DAVIS. Oh, yes.

Dr. BRANSCOMB. Because of the firefighting activity and the warning aspect.

Mr. DAVIS. I don't quarrel with the objective of informing the public. I have no quarrel there. I just thought the other would be a very good, direct way to get at the answer to the problem.

Dr. ROCKETT. Might I interject two points here?

Mr. DAVIS. Certainly.

Dr. ROCKETT. I think it is well to remember that building codes really tell you what your fire problem is going to be a few decades in the future. Codes apply to new construction or to existing construction when the occupancy class changes, but a building which was built to conform to a city building code of 1900, and was a rooming house at that time, still does not have to conform to the present code for roominghouses. However, if it was formerly, say, an apartment, and becomes a roominghouse, then it has to be brought up to the code requirements applicable at that time.

As long as its occupancy class hasn't changed, and it was okay when it was built, it does not have to be retrofitted. This is the current, accepted philosophy of codes. You don't have to go back and constantly upgrade the quality of existing construction unless the use class changes.

So that the firefighter is dealing with the mistakes of the past, if you wish, not the wisdom of the present, or as it will be embodied in the future.

I think that this gets back again to the other point, that we do intend to concentrate a great deal of our effort on the problems of getting better contact with the local jurisdictions, the fire marshals, the inputs that these people have to the building codes.

But there are tremendous training problems. The thing I wanted to add to the training discussion is that you have to remember that the fire problems has been with us for a great many years, and there is a great deal going on now.

It can be improved. But in developing new training programs, we save to develop a positive Federal posture which is appropriate and consistent with existing programs, which strengthen these.

Rather than developing rapidly some Federal analogy, for example, to the FBI school, we must be sensitive to what is going on, and whether perhaps there is a better way through strengthening existing programs, to train local fire officials. This might be through local training units, such as in Texas where Texas A. & M. University has a very well developed fire service extension program, or in this area where the University of Maryland does.

It may be that the best way to reach the local fire people is not to bring them to Washington, but through their local schools, to bring the training to them.

Mr. DAVIS. Yes, I agree with that.

Dr. ROCKETT. And how we most effectively do this, of course, depends on the number of people involved. If you are training high level chiefs, there aren't that many of them, and you have to bring them together in order to have a big enough group to economically train them.

This is our basic problem—mapping the strategy within the existing educational opportunities.

Mr. DAVIS. Well, your points are highly interesting, Dr. Rockett, and I am glad you brought that out, and especially the changes that the mere lapse of time brings about in fire hazards.

Did you want to add anything to that?

Dr. BRANSCOMB. No, sir.

Mr. DAVIS. Another thing I wanted to comment on, on page 11, it says that "the job is so big that all possible resources should be directed toward the problem, and the Federal investment should stimulate increased private effort."

Of course, you are assuming that you will have increased local government effort along with private effort, I assume.

Dr. BRANSCOMB. Yes, sir.

Mr. DAVIS. You don't mean to take anything away from your former statement that we will not be meeting the need if Federal efforts merely replace private or local activity.

I might just say that if that thought were advanced, that it would replace anything like that, then you would have picked up a political hot brick in the House of Representatives, because the idea, I would think, would be to render much needed assistance in a field where you have an expertise that is far better, say, than the average volunteer fireman would have.

Dr. BRANSCOMB. Yes, sir.

I mentioned that specifically, because I believe one must be very careful when one institutes a new Federal program, to be sure that its impact on those who are already engaged in this effort on the private side is not likely to make them say, "Well, if those fellows in Washington are going to take this problem on, we don't have to worry about it any more."

Mr. DAVIS. That's right.

Dr. BRANSCOMB. And that is not the case in this situation.

Chairman MILLER. Of course, most of the work done in this field in the beginning was through insurance companies, was it not? And then a great deal of it through the people who sold fire equipment.

Dr. BRANSCOMB. That's right.

Chairman MILLER. So we don't want to destroy this. But we want to improve it.

Mr. DAVIS. Well, I realize my comment was a little too much like a rifle instead of a shotgun, because I want to give you full credit for grasping the problem. And you brought that out later on page 17, when you said, talking about your center, that the center can provide information that helps local governments, and I think that can't be overemphasized.

What you are doing is helping local governments, not replacing them, to achieve more efficient services to their citizens, and so forth.

Now, one other thing that I wanted to mention briefly. I never appreciated fully, in my own mind, before the unfortunate tragedy to our three astronauts, the danger of smoke inhalation.

I always assumed that the human brain could continue to function, or at least you could maintain the consciousness, for something like 4 minutes, maybe, or at least be alive that long, as you can if you are just simply submerged in water.

But I learned to my complete astonishment that if you inhale carbon monoxide, among other things, that the blood will take that in, in preference to oxygen, and that your chances of survival are nil in just a matter of less than a minute.

At any rate, I was thinking of the many sleeping units of those living in the ghettos, where clothing is no doubt piled in corners, and lots of bedclothes, and maybe six or seven people in a room, and I would think that that would constitute a tremendous hazard which would be awfully hard to guard against.

Nothing about the way the building is built would enter into that problem. If somebody came in and had too many beers or something like that, and dropped a lighted cigarette into a pile of clothing, it would seem to me that that would be a danger of the most imminent kind, and I wonder how you propose to guard against that sort of thing.

Dr. BRANSCOMB. You are certainly right that smoke is a major component of the personal hazard involved in fire. There are many cases where it is clear that it was the smoke and not the heat that actually caused the deaths and injuries.

The bedding fires are a major component of fires that take lives, and in many cases they are a major source of fires which later spread to destroy a structure.

The approach to this problem embodies both the programs that are part of the amended Flammable Fabrics Act and the Fire Research and Safety Act.

Under the former, we are actively studying the question of the feasibility and need for standards that would apply to the problem of bedding fires.

Under the latter, we would be concerned both with protecting the fireman against that smoke hazard—that is, indeed, what the improved mask is needed for—and also with the strategy for fighting a fire, and the proper design of a structure, so that if there is a fire, people have an opportunity to get out while the building is still strong, even though the smoke may be a very major factor.

Dr. ROCKETT. First, on the bedding fires, you spoke of the ghetto. In approximately a quarter of all the building fires in the District of

Columbia, the first material ignited was bedding. This is a very serious problem. In Los Angeles, it was approximately 16 percent of all the building fires.

In both of these cities, the death rate per fire is about double for bedding fires what it is for all others. These are serious fires, in terms of death and injuries. Most of the deaths are due to smoke inhalation, not due to burns. The person may be burned ultimately, when the fire is discovered, but they were dead long before the burn occurred.

Mr. DAVIS. Well, may I interpose a question right there. Then this device that would issue a warning, or turn on a loud alarm, might not necessarily protect you against a bedding fire.

Dr. ROCKETT. You have to be careful. This is why we said "a sensitive device."

Now, for example in our experiments in conjunction with the flammable fabrics program, and in other work which was done by Segall in Los Angeles, and other people have found very much the same thing, a thermal detector, such as a sprinkler, will often not be triggered before a lethal environment has existed for a long enough period of time to have asphyxiated anyone who is present in the room.

Also—but this is not as frequently the case—it is possible to find a lethal environment before something which simply detects obscuration of light will be triggered. (Carbon monoxide, for example, is colorless, so that the pure light obscuration detector may not be sufficiently sensitive to this toxic combustion product.)

We have to develop a detector which will, in fact, protect people who are asleep. It is well known that materials which asphyxiate might just as well have anesthetized the nose. Many people don't understand: Why didn't it wake them up? And the answer is that the nose goes to sleep, too, if you want to put it simply.

Mr. DAVIS. What you need is a canary that would, when it dies, would fall over and trip this alarm.

Dr. BRANSCOMB. Mr. Chairman, let me make sure that Dr. Rockett's comment about a thermal detector is not misinterpreted.

What he says is absolutely true about a detector in the room in which you are trying to protect an individual. However, there obviously is a role for the thermal detector. For one thing, it may be the cheapest detector available. Further, if one is in your basement, for example, it may serve to wake you in your bedroom and tell you that the basement is already burning.

Mr. DAVIS. Yes.

Dr. ROCKETT. There is absolutely no question that the conventional sprinkler system is one of the most effective protectors of property that we have.

Mr. DAVIS. And it doesn't deteriorate with the passage of time, either, does it?

Dr. ROCKETT. It has an extremely good shelf life. I investigated a fire in Boston where the most recent patent on any of the sprinkler heads was a 1906 patent, and they had been installed just a few years after that, in 1908. As far as we could tell, they had never been out of the building for replacement or service, with one or two exceptions. They all worked: this is marvelous reliability.

Chairman MILLER. Somebody had a device that went off like a fire-cracker under certain conditions. I think I have some of them that were sent to me about the time this bill first came up.

Mr. DAVIS. Dr. Branscomb, I was interested to know if you have been having any sort of a dialogue, let's say, with the fire insurance industry with respect to this Act, and the general activities of NBS.

Dr. BRANSCOMB. I personally have not. I know that Dr. Rockett has been talking with the specialists in organizations like the NFPA, which is in part supported, is it not, by the industry?

Dr. ROCKETT. Although five of the 17 directors of NFPA are insurance company executives, most of the financial support of NFPA comes from their publications. I am, myself, a former director of research at one of the largest insurance companies in the United States, and I have made it part of my business to be sensitive to the views of the insurance industry.

They have a very important stake in this problem, and over the years have been one of the principal—as you said yourself, one of the principal proponents of fire protection; and unfortunately have carried nearly the full weight of the problem, although they perhaps have only part of the responsibility. They have a self-interest in a particular aspect of the problem.

I have been trying to develop a very close relationship with the American Insurance Association. They are the principal source, at the present time, for grading of fire departments, and this is an area which comes back to our work with operations research. This grading of fire departments is a form of operations research. AIA has developed techniques for evaluating the effectiveness of the fire protection that is available, and we wish to use to the maximum the expertise that they have in this area.

Mr. DAVIS. I would be interested to know this. Suppose that the incidence of fire were drastically reduced. Of course, that would mean a financial windfall for the fire insurance companies.

But would that be followed by a reduction in premiums? Or do you have to depend on the insurance commissions of the various States to keep a finger on that situation, and say, "Look, gentlemen, we think the premiums ought to be reduced?"

Dr. ROCKETT. I think this would be followed by a reduction in premium because of the competition that exists in the insurance field. The fact that premiums have fallen in response to improve fire protection in the last 100 years, I think, attests to the fact that the efforts of the fire insurance industry themselves to improve fire protection have been matched, when the protection is effective, with the rates coming down.

Mr. DAVIS. Well, I can see that competition would play a major part in that picture.

Dr. ROCKETT. I think it is important to realize that fire insurance is an important part of the liability business. But it is only a part of the liability business, and there are people who say that the insurance companies have no stake in lowering losses, because this would spoil their business.

This is not true. They have a very definite stake, and I think the record supports the fact that they have recognized this stake over the years.

Dr. BRANSCOMB. It is also worth noting that taking this 100-year perspective that I referred to earlier, during which the fire losses had in fact been reduced dramatically in this country, the insurance industry has been growing steadily during that entire time. They have many services to offer.

Dr. ROCKETT. They have much expertise to offer.

Mr. DAVIS. Yes; I would think so.

That's all the questions I have, Mr. Chairman. Do you have any?

Chairman MILLER. No; I have none.

Mr. BOONE. May I pursue one point, Mr. Davis?

Mr. DAVIS. Yes.

Mr. BOONE. Dr. Branscomb, you do have monies in fiscal year 1970 in this program, do you?

Dr. BRANSCOMB. We received, as I said in my testimony, an increase in our 1970 budget, but this increase was not sufficient to implement this program. It was used almost in its entirety to implement our responsibilities under the Flammable Fabrics Act, and to some extent, the metric study, and one or two other things.

So while the appropriation could have been used in small part toward this objective, the amount that would have been available, even if we had given all of the emphasis to this area and none to the other legislative priorities, would have gone only a small way toward an effective start on this program.

Mr. BOONE. Your fiscal year 1971 request has reflected the \$1.5 million that you indicated you would use. In other words, you have increased your request by that amount, at least.

Dr. BRANSCOMB. Our request for fiscal year 1971 is for an increase of \$1.11 million. This in addition to the fire related effort in the building research program of about \$400,000 makes the total request for fiscal year 1971 one and a half million.

Mr. BOONE. All right. Thank you.

Now, what is your total request for appropriation? You can supply it for the record. I just wanted that in the record, in the event we are asked a question on it, we can answer it.

Dr. BRANSCOMB. Right.

Mr. BOONE. And I must say, in view of the history—

Dr. BRANSCOMB. It is approximately \$44 million—\$44,230,000 to be exact.

Mr. BOONE. In view of the history here, are you optimistic about getting \$44 million, which will allow you to start this?

In other words, what basis are you going to make here for the decision to start any of these activities? If you are cut a million and a half dollars this year by appropriations, will you be able to start any of these programs?

Dr. BRANSCOMB. If we are substantially cut this year, we might be able to start some part of these programs, but before deciding to do so, I think we should ask ourselves some very hard questions:

Namely, if we start too modestly, and stretch the development of the program out over too many years, will we have done the public a disservice by appearing to implement the intent of Congress to do something practical about reducing fire losses, as distinct from simply studying it, and by that process, perhaps diverts the attention of the Congress from a problem that is a very real and very urgent problem.

I personally would feel that if the Congress does not indicate that it feels that we should attack this problem vigorously, then perhaps the Congress should take another look at the instrumentality they have chosen to implement their wishes, and choose some other method.

Mr. BOONE. One last point, Mr. Davis.

All of these funds are for title I of the act?

Dr. BRANSCOMB. Yes, sir.

Mr. BOONE. When do you anticipate that the program would grow to \$10 million? Would this be, say, in a 3- or 4-year period? Assuming that 1972 came through at the total amount you requested.

Dr. BRANSCOMB. I would say perhaps a 3- to 5-year period.

Mr. BOONE. Well, my thought was that this then becomes about a fifth of your total budget, assuming some leveling off here of the \$44 million, so this would be a major part of your effort at the Bureau.

Dr. BRANSCOMB. Yes, sir, it would indeed.

Mr. BOONE. Very good. Thank you, sir.

Mr. DAVIS. Dr. Branscomb, I have a communication here from the International Association of Fire Chiefs with respect to this act. I won't take the time to read it, but I have a copy for you, if you'd like to have it, and I also, without objection, would like to place this communication in the record at this point.

I might simply say they are heartily in favor of the act.

Is there anything else that any of your group would like to discuss?

Dr. BRANSCOMB. I don't believe so, Mr. Chairman, except to thank you for this opportunity.

Mr. DAVIS. Well, I want to commend you for a very excellent statement, Dr. Branscomb, and you, Dr. Rockett, for your comments, which were most interesting, and I want to thank all of you for being here this morning, and I certainly know a lot more than I did when I walked in the door this morning.

Thank you ever so much.

Dr. BRANSCOMB. Thank you, sir.

(Whereupon, at 11:20 am., the subcommittee recessed.)

STATEMENT OF THE INTERNATIONAL ASSOCIATION OF FIRE CHIEFS IN
REGARD TO THE FIRE RESEARCH AND SAFETY ACT

The International Association of Fire Chiefs, representing some 6,000 members in the United States, submits this statement in behalf of funding the Fire Research and Safety Act, including both title I and title II of this act.

Due to the rapidity of social and technological change in this country, our fire departments are facing unprecedented demands. The scale of business and Government operations, coupled with the complexity of modern technology and organization, as well as the population explosion, has created a planning gap for the Fire Service which needs to be closed.

We believe the public is complacent toward the rising trends of life and property losses while the Fire Service believes we have reached the limit of acceptability. During 1969, over 12,000 persons lost their lives in fire. It is estimated that for every death over 200 persons are injured. This means that over 2 million citizens of this country are directly affected by the physical tragedies of fire each year.

More than 600,000 residences were destroyed with dollar losses from all causes exceeding \$2 billion. The fact the United States leads the world in the number of fires, fire deaths, injuries and property losses generally receives an apathetic reception.

Fire chiefs are also vitally concerned with the serious lack of communication between the public and the Fire Service. The lack of understanding on the part of individual citizens as to what constitutes fire protection frequently leads to appalling situations. Apparently the average citizen merely assumes the "fire department" is always on hand but has little further interest. Despite our best efforts to date to educate the public to our peculiar needs and the essential service rendered, we still have not been able to bridge this gap.

We are also vitally concerned with the increasing physical attacks on fire fighter personnel by citizens on the streets. With the inception of the civil disorders, which have plagued our cities since 1965, the Fire Service has suffered a number of deaths and many injuries due to assaults on our personnel, and they are continuing on a daily basis.

Closely tied in with these attacks is increasing labor unrest among the professional fire fighters. Whereas "strikes, slow-downs, job actions," etc., were at one time almost unheard of in the Fire Service, they are now becoming commonplace. As the administrators of fire departments, this has caused us grave concern, and we are struggling to find solutions.

The Fire Service itself has been striving to find the answers to these challenges while at the same time coping with the everyday problems of increasing the efficiency and utility of its manpower, apparatus and equipment. Unfortunately, the Fire Service is one of the most underfunded areas of local government. Practically 95 percent of every budget dollar in the professional service goes for salaries of the men.

The remaining 5 percent must cover all operational costs, including maintenance and repair and the purchase of new items and general supplies.

With such limitations, little or no funds are available for research and development. Traditionally, we have had to depend on our suppliers to do effective product research and, as such, this has generally been governed solely by the market potential of a specific item. As a result, our progress has been slow.

We, therefore, believe the Department of Commerce, through the National Bureau of Standards, can make a significant contribution toward better fire safety for the people and at the same time assist the 24,000 local fire departments improve their operations, if this act is implemented.

Demonstration projects carried on by the National Bureau of Standards in the significant areas could help guide the Fire Service to fill the needs outlined above. These projects, coupled with apparatus and equipment research, might have a dramatic effect within a few short years.

Another area is the establishment of a high level training academy or college for the Fire Service to assist in upgrading the professional standing of Fire Service member's in conjunction with presently developing college-level education and by supplementing existing local level training. This is foreseen in the act and could go a long way toward reaching acceptable solutions in this particular area.

We believe that implementation of title II of the act is most vital. This will permit establishment of a commission which can define the areas of necessary actions as a guide for the National Bureau of Standards. The commission, made up of persons of prestige, such as Senators and Members of Congress together with representative fire protection authorities, could pinpoint the problems and help make the people aware of the actions necessary to meet the needs for the welfare of the communities and the Nation as a whole.

We call to your attention the fact that this association has supported the necessary action over a period of some 8 years which led to the culmination of legislation from which came this act. We were pleased when this act became law. However, we know that unless funds are made available to provide effective action under both titles I and II, little good will have been accomplished.

We, in the Fire Service, are directly concerned with the responsibility of providing protection for life and property against fire. We are daily faced with grim situations which eventually become the statistics we quote. We appeal to you for assistance in what we believe is a very moderate request for funds in the hope that we may reverse the trends and truly provide better protection for all our citizens.

We realize that unless this act is funded by June 30, 1970, it will expire. We find it difficult to believe that Congress is completely insensitive to the needs of the public and the Fire Service in this area of safety. We hope Congress will demonstrate its awareness by funding this act.



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