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Dr. I. W. Hughes

Report of the
International Association
of Fire Chiefs

Ad Hoc Committee on
Fire-Safe Cigarettes

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Chief William Stamm
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REPORT OF THE INTERNATIONAL ASSOCIATION OF FIRE CHIEFS

AD HOC COMMITTEE ON

FIRE-SAFE CIGARETTES

WILLIAM STAMM, Chairman
Chief, Milwaukee Fire Department

JOHN J. HART, Chief
New York Fire Department

DR. DIETRICH HOFFMAN, Associate Director,
Naylor Dana Institute for Disease Prevention,
American Health Foundation

DR. RICHARD D. STEWART, Corporate Medical
Director, S.C. Johnson & Son, Inc.

PROFESSOR RICHARD L. P. CUSTÈR, Associate
Director, Center for Fire Safety Studies,
Worcester Polytechnic Institute

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REPORT OF THE INTERNATIONAL ASSOCIATION OF FIRE CHIEFS
AD HOC COMMITTEE ON FIRE-SAFE CIGARETTES

Background

At the International Association of Fire Chief's annual meeting in Atlanta on August 28-31, 1983, the chiefs decided that they needed better technical information to make an informed decision on whether to support resolutions regarding fire-safe cigarettes. And if there are to be resolutions, what they should be. There had been many opinions expressed in the past, but few documented facts had been made available to the chiefs either from proponents of self-extinguishing cigarettes or those who thought they were not such a good idea.

Chief William Stamm of Milwaukee was asked to select and chair an Ad Hoc Committee to find out what was really known and what was not. The Committee was to review documented research, expert testimony, the ideas and data from various chiefs, and the positions of the various sides to the discussion. The Committee was then to recommend a course of action for the IAFC.

Ad Hoc Committee

The Committee selected, after many suggested names were researched and considered to assure that no one had a special interest and would be 100% impartial, consisted of two IAFC Metropolitan Fire Chiefs, one a smoker and the other not; two medical scientists with background relevant to the toxicology of smoke; and two scientists with fire-related backgrounds. The following individuals were selected; all agreed to serve totally at their own expense:

- Chairman - William Stamm, Chief, Milwaukee Fire Department
- John J. Hart, Chief, New York City Fire Department
- Dr. Dietrich Hoffmann, Associate Director, Naylor Dana Institute for Disease Prevention, American Health Foundation
- Dr. Richard D. Stewart, Corporate Medical Director, S.C. Johnson & Son, Inc.
- Professor Richard L. P. Custer, Associate Director, Center for Fire Safety Studies, Worcester Polytechnic Institute
- Dr. Edward Clougherty, Chemist, Boston Fire Department (subsequently declined)

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Dr. Clougherty had to drop out of participation because of funding problems in his city.

The Chairman feels he was fortunate in getting such a distinguished group on relatively short notice. Resumes of the remaining five active members are contained in Attachment 1.

Information Gathering

Prior to the first meeting of the Committee, the Chairman circulated articles, congressional testimony, and other materials relevant to the issue to the Committee members and to representatives of the different sides of the issues so that everyone had the same information and could comment on any of the various submissions from other parties. The idea was to put all of the information on the table, so all could review it.

The Chairman also met with various chiefs so he could better represent their collective opinion. He also sent a tentative agenda of issues to be discussed at the meeting to the Committee members and to numerous Metropolitan Chiefs. Many of the chiefs provided him with written or verbal comments on the issues. The tentative agenda of issues is attached (see Attachment 2). It was meant to be only a starting point for discussion and not a limitation.

The Chairman also sent letters requesting information on the issues to the U.S. Fire Administration, Consumer Product Safety Commission, the tobacco industry, leading proponents of self-extinguishing cigarettes, and others (see Attachment 3).

To provide technical information to the Committee on the nature of cigarette-related fires, the research on self-extinguishment, and other aspects of cigarette technology and to give it a chance to ask in-depth questions, several experts were invited to make presentations at the Committee meeting and also totally at their own expense.

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The four experts selected from four different fields were:

Dr. John F. Krasny, Center for Fire Research, National Bureau of Standards -- to summarize the Center's research on the ignition propensity of cigarettes.

Dr. Alexander W. Spears, Executive Vice President, Operations and Research, Lorillard -- to summarize relevant aspects of cigarette technology and the tobacco industry's fire test experience.

Philip S. Schaenman, President, TriData Corporation, and former Associate Administrator of the U.S. Fire Administration -- to summarize national data on cigarette-related fires.

Arthur C. Delibert, President, Citizens Committee for Fire Safety -- to summarize information backing the views of the proponents of fire-safe cigarette standards.

Resumes of the four technical experts are contained in Attachment 1.

These experts also were sent copies of the issues and available data, so they could be prepared to comment on the various information collected by the Committee, as well as their own.

The Chairman directed all parties connected with this Committee to be prepared to back up their comments with facts that were or could be documented.

The Meeting

The Committee met on November 16, 1983, in New York City at the offices of the American Health Foundation, courtesy of Dr. Hoffman. Klaus Brunneman, a research colleague of Dr. Hoffmann at the American Health Foundation, also attended and assisted Dr. Hoffmann.

The Committee met in private at the start of the meeting, then listened to the four invited experts, asked many detailed questions, and finally met in private again to close the meeting.

At the meeting, a large volume of technical papers was given to the Committee by Dr. Spears. These were the references in support of his previous Congressional testimony on behalf of the tobacco industry and on his presentation to the Committee. A listing of the references can be found in Attachment 4; most are from the open literature and are available to anyone who wants them. (The entire volume was too bulky to attach here, but the references are available from the Chairman if they cannot be obtained elsewhere.)

Dr. Krasny presented physical samples of the cigarette burn tests he performed and described his test procedures and their scope. Copies of his graphs are contained in Attachment 5.

Mr. Schaenman presented U.S. Fire Administration estimates for 1976-1981, plus the 1982 estimates he made for the Committee based on U.S. Fire Administration and NFPA data of the magnitude of smoking-related fire losses, trends, the materials involved in ignition, and other relevant statistics. His paper is Attachment 6.

Mr. Delibert presented remarks mostly on the political, legal, and administrative aspects of proposed legislation. His paper is Attachment 7.

At the end of the meeting, the Committee decided that each Committee member would submit an independent summary of his conclusions and recommendations in writing to the Chairman, who then would put together a draft report. These letters are Attachment 8. You will note the Chairman did not submit a summary to assure that the other members would not be swayed in their thinking; however, his thoughts are incorporated in the final report. The draft was then considered by each member. Comments received were incorporated into this final report.

* * * * *

The conclusions and recommendations of the IAFC Ad Hoc Committee on Fire-Safe Cigarettes are summarized as follows:

Conclusions

Leading Fire Problem 1. National data continue to indicate that cigarettes are the leading source of ignition in fire deaths. The typical scenario in 1982 continues to be a cigarette dropped on upholstered furniture (2/3) or bedding (1/3). A working smoke detector was not present in the vast majority of the deaths.

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Trend

2. The national data also show that cigarette-related fire deaths and cigarette-related fires have been dropping over the last six years. Fire deaths dropped 20% according to the U.S. Fire Administration/Schaenman estimates, and 29% according to CPSC. Smoking-related fires dropped 33% according to USFA/Schaenman and 40% according to CPSC. (See Attachment 9 for the CPSC data.)

Causes of Trend

3. There is no definitive study of reasons for this decline but there must be something that is having a beneficial effect. It is not the cigarettes themselves. They have not been modified during this period in respect to self-extinguishing properties, and cigarette sales have not followed the pattern of deaths.

One thing that is clear is that smoke detector usage has increased dramatically. It went from 20% of households in 1977 to 67% of households in 1982. It is highly likely that this is having an effect on the number of fires and deaths. The safety effect could be further increased if smoke detectors are properly maintained and if the use of smoke detectors can be further spread among low income families, of whom only one-third now have detectors.

Other possible reasons for the decline in smoking-related fires and fire deaths are increased public education and increased usage of safer mattresses and upholstered furniture, but this is speculative at this point.

Medical Side Effects a Major Concern

4. There is considerable reason to believe that the proposed methods of making cigarettes self-extinguishing will substantially increase tar, nicotine, and carbon monoxide levels. Also, the amount and composition of the smoke may change. The medical experts on the Committee warned that self-extinguishing cigarettes might cause far more deaths and illnesses than the number of people who might be saved from fires, even if all fire deaths involving cigarettes were eliminated. The potential for doing more harm than good is very large and must be considered.

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Cigarette
Testing Not
Adequate
To Date

5. Some tests indicate that a few brands of cigarettes "self-extinguish" in some circumstances; that is, they go out if not being puffed. Some brands of cigarettes may burn a smaller hole than others when placed on a simulated furniture substrate in the laboratory. However, the data are inconclusive as to whether there is a significant difference in ignition potentials among existing brands for real world situations. The laboratory tests have not been correlated with real world performance. In particular, no attempt has even been made to correlate with real world experience the tests proposed by Dr. Krasny at NBS for rank ordering the propensity of cigarettes to start fires. And his test did not consider crevices or "hot end down" positions. Doctor Krasny's initiative should be applauded, but he agrees, it was just the start of the testing that is needed. Unless a test can be linked to the real world, there can be no meaningful standard. Based on the available information, we conclude that this is an area that requires additional, thorough, third party testing.

Burn
Temperature

6. The temperature at which all brands burn is far above that needed to ignite virtually all existing mattresses or upholstered furniture materials. It has been shown that the burning temperature (about 800° C) can be varied somewhat ($\pm 50^\circ$) by altering various parameters of the cigarette, but not enough to make a significant difference in ignition propensity.

Ignition
Propensity of
Existing
Brands

7. All tested brands can ignite any of the easy-to-ignite materials such as cottons. (The tobacco industry says their tests show this is true for Sherman, Carlton, and More as well as other brands; no data were presented to either support or refute this.) Unfortunately, the low income groups that have the most fire deaths are also likely to have the cheaper, easier to ignite materials such as cotton. About 50% of all furniture in use today contains cotton batting.

All tested brands can ignite furniture if they land hot end down or land in a crevice in the furniture. You can get ignitions even with the "low propensity" cigarettes.

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Unfortunately, there has not been adequate testing of cigarettes in these situations -- only scattered anecdotes. There is also no solid information as to whether these are the situations leading to fire deaths or whether the "landing flat" scenario is equally a problem in serious fires.

None of the existing brands of cigarettes are likely to ignite some types of material such as man-made upholstery materials if they fall flat on them.

As mentioned above, we repeat and emphasize that testing to date is inadequate to support either the claims that a satisfactory fire-safe cigarette can be made or that it cannot be made.

**Potential
for Improve-
ment Exists**

8. All parties believe that it may be possible to develop a more fire-safe cigarette without bad side effects, although no one has yet put evidence on the table that it can be done. Research by the industry (including research with varying diameters and packing density) has not yet found a solution. Additives are a possibility, but the ones proposed in patents for this are likely to prove toxic.

Neither the tobacco industry nor NBS researchers nor anyone on the Committee believes the situation is hopeless. All of us believe it is important to continue to search for a solution.

Additives

9. The tobacco industry maintains that it does not add salt-peter or anything else to tobacco to make it burn faster. They say that there is no additive that, if removed, would make cigarettes self-extinguishing. They do report that there are additives to cigarette paper to make it burn even with the tobacco; however, the deletion of these additives would not make cigarettes self-extinguishing but rather would create cigarettes with looser fire cones or irregular burning. Humectants are added to retain enough moisture to keep the tobacco from drying out and burning too fast, but removing them would not have the desired fire-safety effect.

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There are nitrates in fertilizer used to grow tobacco. But the tobacco plants themselves contain nitrates, too, according to the industry. The Sherman cigarette, which claims to have no additives, was found to have the highest level of nitrates of any cigarettes tested by the industry. The Sherman cigarette uses tobacco that is more similar to pipe tobacco than to cigarette tobacco, which is why it burns slowly and usually self-extinguishes.

Some
Improvement
Would
Suffice

10. A "safer cigarette" does not have to eliminate all smoking-related fire deaths to be an improvement. If a way is found to make cigarettes that do not ignite fires in some situations where they now do, that would be a worthy goal -- so long as they do not cause more harm than good. On the other hand, a cigarette that does not affect most of the fires that now start or could start should not be labeled fire-safe. If people think cigarettes are truly "fire-safe," they may be more careless with them and that may lead to more fires than we have now.

Recommendations

1. The IAFC should change the resolution it has passed regarding self-extinguishing cigarettes. The IAFC should not recommend to the federal government or state legislatures to pass legislation to set standards for cigarettes at this time. The IAFC should not support the Moakley bill or the Heinz bill as they were originally introduced. No one seems to know how to set standards with present knowledge. If a federal study finds a way to develop cigarettes that are more fire-safe, then standards should be set at that time. If no one can find a satisfactory way to make cigarettes safer, we would look foolish to be requiring standards, and might cause harm through health effects.
2. Instead the IAFC should support legislation that would require a comprehensive scientific federal study to be undertaken as soon as possible to see if there is a way to make cigarettes more fire-safe without side effects that are worse than the cure. The study should include testing of existing

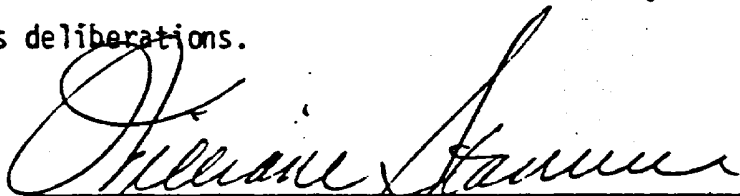
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brands for relative fire safety and should look at new ways to make a cigarette. The study should have no strings attached for any interested parties.

3. The study should include research to establish a methodology to measure the self-extinguishing characteristics of cigarettes. To be valid, the tests should cover the range of furniture substrates commonly found in the real world.
4. To be valid, any standard must be based on real world, full scale fire tests, or show that lab test results can be extrapolated to the real world. It is not enough to show differences using lab tests alone that have not been correlated with real world conditions.
5. Any proposal for a cigarette considered to be fire safe must be tested to ensure that it does not produce greater amounts of potentially harmful substances than are in the smoke of current cigarettes. If it does produce a greater quantity of potentially harmful substances, the cigarette should be tested further at least with animal toxicology studies before any legislation is considered for setting fire-safety-related standards. (An outline of such testing is included in Doctor Hoffmann's attached letter.)
6. The federal study should conduct all phases of research under the supervision of a panel of experts who have skills in fire science, medicine, tobacco science, and consumer interests. These should include people from federal government health, fire consumer safety, and standards agencies; the tobacco industry; the fire service; other relevant industry; and consumer advocacy groups or fire-related foundations. Specific federal agencies must include the Consumer Product Safety Commission, National Bureau of Standards, the Federal Management Agency, and the Department of Health and Human Services. Fire organizations to consider include the NFPA and the IAFC.

7. The federal study should include a risk analysis that considers all the ramifications of changing today's cigarettes -- not just in potential health impacts but also behavioral changes (e.g., more or less attention to care with cigarettes, relighting of cigarettes, changes in the usage of cigarettes, potential impact on number of smokers, etc.)
8. No state or political subdivision thereof shall establish, maintain or enforce any fire-safety standard for cigarette products until after the conclusion of the federal study. This should not keep them from doing their own research on the subject during the time of the federal study. Once the federal study is completed, individual states may or may not conclude that the facts warrant the enactment of state standards. The IAFC should reserve comment on state legislation until that time.

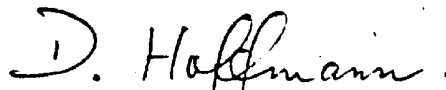
The Chairman greatly appreciates the thoughtful contribution and time of the Committee members. The Committee also wishes to thank the many people who contributed to its deliberations.



WILLIAM STAMM, Chairman
Chief, Milwaukee Fire Department



JOHN J. HART, Chief
New York Fire Department



DR. DIETRICH HOFFMAN, Associate Director,
Naylor Dana Institute for Disease Prevention,
American Health Foundation



DR. RICHARD D. STEWART, Corporate Medical
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PROFESSOR RICHARD L. P. CUSTER, Associate
Director, Center for Fire Safety Studies,
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ATTACHMENTS

- Attachment 1. Resumes of Committee Members (5)
Resumes of Technical Experts (4)
- Attachment 2. Preliminary Agenda of Issues
Original Charge to Committee
Points To Be Cleared Up
- Attachment 3. Chairman's Letter Requesting Information from
Government and Industry
- Attachment 4. List of Papers Supporting the Tobacco Industry's
Research (Dr. Spear's testimony)
- Attachment 5. Graphs on NBS Cigarette Burn Tests (which
accompanied Dr. Krasny's testimony)
- Attachment 6. Statistics on Smoking-Related Fires
(Mr. Schaenman's testimony)
- Attachment 7. Citizens Committee for Fire Protection
(Mr. Delibert's testimony)
- Attachment 8. Letters from Committee Members on Their Individual
Conclusions and Recommendations
- Attachment 9. CPSC Fire and Fire Death Data

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Fire Department

William Stamm
Chief

Richard P. Seelen
Assistant Chief

October 1983

RESUME
of
WILLIAM STAMM

He is now completing almost 43 years of service, entered upon his career on December 20, 1940, when he was appointed as a firefighter with the Milwaukee Fire Department. Following is his progress through the department:

- April 1948 - Fire Lieutenant
- Oct. 1950 - Fire Captain
- July 1959 - Battalion Chief
- July 1962 - Deputy Chief, Fire Training & Special Services, in charge of the Bureau of Instruction & Training
- Oct. 5, 1970 - Appointed Chief of the Milwaukee Fire Department

While serving as Training Director for the Fire Department for 9 years, Chief Stamm expanded and developed community fire training programs. He also led in planning and instituting the higher education program which leads to an Associate in Science degree in Fire Technology at the Milwaukee Area Technical College, and himself is a recipient of the degree. He has had close contact with almost all of the colleges in the United States, which include fire training in their curriculum, and he has been a guest speaker in many schools, and seminars and conferences.

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He was asked by the U.S. Government to travel to Nicaragua after the 1973 earthquake and evaluate their fire service, upgrade their firefighting and equipment, and select a site for and assist in planning a fire training center. He was then designated as Fire Equipment Relief Coordinator in the United States to assist the Organization of American States and the Government of Nicaragua to obtain replacement of essential fire apparatus and equipment destroyed in the devastating earthquake.

Chief Stamm is a member of several committees of the NFPA as a representative of the International Association of Fire Chiefs, and a member of the Metropolitan Committee of the IAFC.

He worked closely for 35 years with the Red Cross in the area of safety and disaster programs, and was Chairman of the Disaster Committee of the Greater Milwaukee Chapter for 10 years, where he was also on the Board of Directors. He also served on the Board of Directors of Good Samaritan Medical Center for 18 years.

Past chairman and current member of the 12-man Joint Council of National Fire Service Organizations. (These are members representing each of the various organizations, such as International Association of Fire Chiefs, International Association of Fire Fighters, Arson Investigators, Fire Service Instructors, etc.).

Consultant for McDonnell Douglas relative to fire-related problems of the Suspended Maneuvering System.

Fire service representative as a member of a committee to work with Shriner's Burn Centers to introduce a national program to prevent burns to children.

Received State Firefighter of the Year Award from Schlitz Brewery.

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Received Distinguished Service Award from Partners of the Americans.

Received National Firefighter of the Year Award from Eagles.

Received Dictograph's Award for "outstanding contribution in the field of public safety."

Chief Stamm has visited most areas of the United States, as well as foreign countries in both hemispheres, calling at fire department training academies wherever he happens to be, to discuss ideas, successes and failures in the fire protection field, and to bring home new concepts and methods for evaluation and possible use in his own department.

Chief Stamm is affiliated with many other service organizations, but then, as he says . . . so is everybody else.

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October 3, 1983

R E S U M E

JOHN J. HART

CHIEF OF DEPARTMENT
NEW YORK CITY FIRE DEPARTMENT

HOME: 872 Park Avenue
Huntington, N.Y. 11743
(516) 271-4656

OFFICE: 250 Livingston Street
Brooklyn, N.Y. 11201
(212) 403-1434

PERSONAL: Born May 29, 1931, U.S. Citizen, Excellent health,
Married, 3 children 25, 23, 15

EDUCATION: M.S. Business Administration
Columbia University, 1978

ASSOCIATION: Member of Society of Fire Protection Engineers, National Fire
Protection Association, International Association of Fire
Chiefs, New York State Fire Chiefs Association.
Vice-Chairman to Metropolitan Committee, International Asso-
ciation of Fire Chiefs.

EXPERIENCE: Current: Appointed Chief of Department, New York City Fire
Department on November 24, 1980

Direct the policy and management of the uniformed force in all
aspects of firefighting and fire prevention for the City of
New York.

Over the past thirty years I have served in all areas of the City and
in all ranks in line functions that have included continuous fire command.
My staff functions over the past ten years include:

1980 - Personnel Director, NYCFD

- a. Direct both the uniformed force of 11,800 and the civilian
force of 1,000 on all matters relative to personnel manage-
ment, administration, promotion, recruitment and vacancy
control. This entails interaction with other agencies
such as the Office of the Budget, Mayor's Office and the
Department of Personnel in obtaining their cooperation and
support in the administrative processing of matters affecting
personnel actions of the Fire Department.
- b. Serve as City-Wide Command Chief and as Administrative
Reserve Chief as scheduled at major fires and emergency
operations throughout the city.
- c. Agency examiner for the New York City Department of Personnel
representing the Fire Department in the preparation, evalu-
ation and rating of all examinations for civil service
fire personnel.

(Cont'd...)

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1978/1979 - Borough Commander, Bronx

- a. Administer, manage and direct all firefighting resources in the Boro of the Bronx, which consists of 3 Divisions, 11 Battalions and 59 firefighting Engines, Ladders and special units. The personnel of this command consists of 72 Chief Officers, 209 Company Officers and 1543 Firefighters with an annual operating budget of 38 million dollars.

1977/1978 - Chief in Charge, Bureau of Support Services

- a. Executive Director of the Medical Division, Division of Fire Prevention, Division of Repairs and Transportation, and the Division of Planning and Operations Research. Inclusive in this position was the preparation and oversight of a combined annual operating budget of 15 million dollars.

1976/1977 - Director of Management Planning

- a. Planning and implementation of new management programs including the introduction and direction of a successful management by objectives system.
- b. Director - Development and implementation of personnel evaluation systems, approved by the New York City Department of Personnel and now operational for all ranks of the department.
- c. Liaison - New York City Mayor's Management Advisory Board
- d. Coordinator - Professional development systems implemented in conjunction with the Urban Academy of the University of the City of New York.

1975 - Deputy Borough Commander, Manhattan

- a. Developed a Field Performance Evaluation System now in use city-wide to assess the command performance of all Chief Officers at major operations.

1973/1974 - Developed and directed a Line Officers Training Program covering all major aspects of the supervisory requirements of Captains and Lieutenants in the Fire Department. Among the tasks involved were site selection, instructor recruitment, curriculum development and the daily operation of a school with over 100 students.

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RICHARD L. P. CUSTER

Experience:

- 1982-Present Associate Professor of Fire Protection Engineering at Worcester Polytechnic Institute and Associate Director of the WPI Center for Firesafety Studies. In addition to an academic program leading to a Master of Science degree in Fire Protection engineering, the Center conducts research and offers seminar and continuing education programs in the fire safety area.
- 1981-Present President of Richard L. P. Custer and Company, consultants in fire protection, fire testing and fire research. Work has included fire testing, interpretation of codes and standards, conducting workshops and technical expert services.
- 1981 Executive Director of the National Center for Technology in Law, Inc., a company that was formed to serve as a clearing house for technical information used in personal injury litigation.
- 1979-1980 Recipient of Department of Commerce Science and Technology Fellowship. Served as Energy Aide on the staff of U.S. Senator John C. Culver.
- 1970-1981 Employed in a variety of capacities in the Office of Fire Research and Safety (later to become the Center for Fire Research) at the U.S. Department of Commerce National Bureau of Standards. From May 1970 to June 1971, full- and part-time consultant working on fire reporting systems, protective clothing and fire spread research. In June 1971 accepted full-time position. Work included fire testing, evaluation of fire protection equipment, participation in national and international standards-making groups, and technical management. While at NBS, positions held were fire prevention engineer, Chief of the Fire Detection and Control Systems Program, Acting Chief of the Fire Performance Evaluation Division and Associate Director of the Center.
- 1967-1971 Lecturer in Fire Protection Engineering Curriculum at the University of Maryland. Courses taught in principles of fire protection, building codes, fire department operations and special fire protection problems.
- 1966-1967 Engineering Geologist, North Carolina Highway Department. Conducted field studies of soil and rock conditions associated with proposed highway alignments.

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Work consisted of surface and sub-surface investigations, soil sampling and measurements of load-bearing capacity. Responsible for preparing reports and cross section drawings.

Additional Experience:

- 1980-1981
(Spring) Taught Building Construction for the Fire Service at Montgomery College, Rockville, Maryland.
- 1968-1969
(Summers) Safety Officer and Fire Prevention Engineer for the U.S. Veteran's Administration conducting inspections, reviewing plans and specifications and carrying out special projects.
- 1969-1970 Participating faculty member in a project to teach the fundamentals of the National Fire Protection Association Life Safety Code at NASA facilities throughout the country.

Eleven years experience as a volunteer firefighter and fire officer in Pennsylvania, North Carolina and Maryland. Held positions as firefighter, Fire Captain, Training Officer and Fire Marshal. During this period, completed numerous courses relating to fire service activities including hazardous materials, tactics and emergency medical technology.

Education:

B.A., Geology, University of Pennsylvania, Philadelphia
M.S., Geological Engineering, North Carolina State University, Raleigh

Honors: Salamander Honorary Fire Protection Engineering Society

Professional Appointments:

Past member, National Fire Protection Association, Automatic Sprinkler Committee.

Past member, National Fire Protection Association, Sub-Committee on Residential Sprinkler Systems.

Past member, National Fire Protection Association, Life Safety Code Sub-Committee on Suppression System.

Past member, U.S. Delegation, International Standards Organization, Fire Suppression Equipment and Systems Committee.

Past chairman, National Fire Protection Association, Sprinkler Committee, Special Sub-Committee on Fire Loading.

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Past chairman, Fire Science Advisory Committee for
Montgomery College, Rockville, Maryland.

Member of Advisory Board, Foundation for Fire Safety.

Professional Affiliations

National Fire Protection Association (Member, Fire
Services Section)

Standards Engineering Society

New England Chapter, Society of Fire Protection Engineers
(Chairman, Education Committee)

American Society for Testing and Materials (ASTM)

International Association of Arson Investigators

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Publications:

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2. Paleocurrents of the Triassic Durham Basin, NC, 1966, Jour. Elisha Mitchell Sci. Soc., Vol. 82, No. 2. (Also presented at Southeastern Section, GSA.)
3. Occurrence of Limestones in the Durham Triassic Basin, 1967, Jour. Elisha Mitchell Sci. Soc., Vol. 83, No. 3.
4. Hood and Custer, Use of the Frantz Isodynamic Separator for Semi-quantitative Analysis of Iron in Trioctahedral Micas, 1967, Jour. Elisha Mitchell Sci. Soc., Vol. 83.
5. Hood and Custer, Mass Magnetic Susceptibility of Some Trioctahedral Micas, 1967, American Mineralogist, Vol. 52, pp. 1643-1648.
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8. Principles of Industrial Fire Protection, Industrial Fire Protection Management Seminar, University of Maryland, May 1971.
9. Test Burn and Failure Mode Analysis of an Air-Supported Structure, Fire Technology, Vol. 8, No. 1, February 1972.
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15. National Bureau of Standards Sprinkler Research Activities, American Society of Plumbing Engineers, June 14, 1974.

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16. Corridor Sprinkler Research, Copper Development Association, June 18, 1974.
17. Detector Actuated Automatic Sprinkler Systems--A Preliminary Evaluation, National Bureau of Standards, Tech. Note 836, July 1974.
18. Smoke Detection Principles and National Bureau of Standards Research Efforts, HUD Field Engineers, October 1974.
19. Research in Automatic Suppression, Fire Protection Engineering Students, University of Maryland, October 1974.
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Max-Planck Institut fuer Biochemie der Universität Muenchen, Germany	Ph.D.	1957	Biochemistry

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1957-1960 Sloan Kettering Institute for Cancer Research, New York, N.Y. - Visiting Research Associate
1960-1966 Sloan Kettering Institute for Cancer Research, New York, N.Y. - Associate
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Memberships:

American Association for Cancer Research	Air Pollution Control Association
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National and International Responsibilities 1970-Present:

1970-1972 Consultant Biologic Effects of Atmospheric Pollutants, National Academy of Sciences, Washington, D.C.
1973-1975 Member, Tobacco Working Group, National Cancer Institute, Bethesda, MD.
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1979-1980 Member, Health Effects Panel, Diesel Impacts Study Committee, National Research Council, Washington, D.C.
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(July, 1959-September, 1962)

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Post-Graduate
Fellowship:

Atomic Energy Commission, University of Michigan,
School of Public Health (1961-62)

Licensure:

State of Michigan: License No. 21811 (Issued June 29, 1956)
State of Wisconsin: License No. 15887 (Issued Jan. 11, 1967)

Certification:

Diplomate, American Board of Internal Medicine (1974)
Diplomate, American Board of Medical Toxicology (1976)
Diplomate, General Toxicology, The Academy of Toxicological
Sciences (1983)

Fellowships:

Fellow, American College of Physicians (1975)
Fellow, American Occupational Medical Association (1975)
Fellow, American Academy of Occupational Medicine (1976)
Fellow, American Academy of Clinical Toxicology (1982)

Prior Experience:

Staff Physician, Medical Department, The Dow Chemical Company (1956-1959)
Director of the Medical Research Section, Biochemical Research Laboratory,
The Dow Chemical Company (1962-1966)
Active Staff, Internal Medicine, Midland Hospital (1962-1966)
Associate Professor of Preventive Medicine; Chairman, Department of
Environmental Medicine, Marquette School of Medicine (July, 1966-
June, 1969)
Professor and Chairman, Department of Environmental Medicine (1969-1978) with
secondary appointments in Internal Medicine and Pharmacology,
The Medical College of Wisconsin
Corporate Medical Advisor, S. C. Johnson & Son, Inc. (1971-1978)
Chief of Clinical Toxicology Service, Milwaukee County Medical Complex
(1975-78)
Member of Corporate Research Board, S. C. Johnson & Son, Inc. (1976-80)

Honorary Societies:

Phi Theta Kappa (1949)
Phi Kappa Phi (1951, 1962)
Sigma Tau Delta Honorary English Fraternity (1982)

Honors and Awards:

1963 Authorship Award: Honorable mention winning paper from Industrial
Medicine and Surgery's First Annual Awards Competition, 1963:

Stewart, R. D.: "The Evolution of the Industrial Physician - Ascent
or Decline?" Ind. Med. Surg., 34:39-42, (Jan.), 1965.

1965 Authorship Award for the most outstanding paper published in the
American Industrial Hygiene Association Journal, 1964:

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Stewart, R. D., and Dodd, H. C.: "Absorption of Carbon Tetrachloride, Trichloroethylene, Tetrachloroethylene, Methylene Chloride, and 1,1,1-Trichloroethane through the Human Skin," Am. Ind. Hyg. Assoc. J., 25:439-446, (Sept.-Oct.), 1964.

1967 Authorship Award: Presented by the Research Society of America, Midland Branch, for the most outstanding and original research paper published, 1965-1967:

Stewart, R. D., Dodd, H. C., Erley, D. S., and Holder, B. B.:
"The Diagnosis of Solvent Poisoning," JAMA, 193:1097-1100,
(Sept.), 1965.

Honorary Member, Milwaukee Fire Department (1970)

Milwaukee Fire Department Distinguished Service Award (1971)

Distinguished Service Award from the Committee of Public Health, Montero, Bolivia, ". . . for conducting the investigation of Chagas' Disease in our community and for teaching our doctors." (1972)

A.M.A. Physician's Recognition Award in Continuing Education: (1973-1976), (1976-1979), (1979-1982)

The Third Simon C. Weisfeldt Memorial Award (Co-recipient with Herbert E. Stokinger, Ph.D.), The Medical College of Wisconsin (1975)

Milwaukee Fire Department Distinguished Service Award in Recognition of an Outstanding Contribution to the Fire Service (Second DS Award) (1975)

Milwaukee Fire Department Distinguished Service Award, "In Recognition of the Development of a Program of Medical Surveillance to Protect the Lives of Fire Fighters." Separate award each year 1976-1980.

Founders' Day Award for the invention and development of the hollow fiber artificial kidney, 1979.

National Kidney Foundation Dialysis Pioneering Award "In Recognition of Your Historic Contribution to the Development of Kidney Dialysis as a Life-Saving Therapy," December, 1982.

Community Activities

Chairman, Citizens' Advisory Council on Air Pollution Control, Milwaukee County, 1971-1973.

Technical Advisory & Coordinating Research Committee, Southeastern Wisconsin Regional Planning Commission, 1974-75.

Boy Scouts of America:

Scoutmaster, Troop 55, Brookfield, Wisconsin, 1967-1971

Post Advisor, Post 155, Brookfield, Wisconsin, 1971-1972

Elmbrook District Advancement Chairman, 1973

Church:

Chairman, Commission on Missions, Elm Grove Community
United Methodist Church, 1967-1968

Chairman, Pastor-Parish Relations Committee, Elm Grove Community United
Methodist Church, 1972

Board of Benevolences, First Congregational Church, Wauwatosa, 1974-76

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Rotary International:

Brookfield, 1975-78
Racine, Wisconsin, 1978-

St. Andrew's Society of the City of Milwaukee, 1979-

Advisory Medical Staff, Milwaukee Fire Department (1975-)

Hobbies:

Creative writing
English literature
Wilderness hiking and camping
Canoeing

Current Additional Professional Activities:

Medical Editorial Boards:

Editor, Environmental-Occupational Medicine Section, Clinical Medicine,
Harper & Row (1980-)
Editorial Board, Poisindex (1976-)
Consultant for Chest (1978-)
Contributing Editor, American Journal of Industrial Medicine (1979-)

Current Memberships:

American College of Physicians (1965)
American Medical Association (1957)
Wisconsin State Medical Society (1967)
Racine County Medical Society (1980)
American Society for Artificial Internal Organs (1966)
American Occupational Medicine Association (1972)
American Academy of Occupational Medicine (1972)
Society of Toxicology (1965)
American Academy of Clinical Toxicology (1972)

Current Medical Research Projects

1. Five-Year Prospective Epidemiological Study of Chagas Disease in Cruz del Eje, Argentina (1978-83).
2. Ten-Year Prospective Epidemiological Study of Heart and Lung Disease in Milwaukee Fire Fighters (1975-84).
3. Ten-Year Prospective Epidemiological Study of Heart and Lung Disease in Racine Fire Fighters (1980-90).
4. Development of an Artificial Skin.
5. Measurement of DEET Absorption Through Human Skin.

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Research Projects Completed While Full-Time Faculty, The Medical College of Wisconsin (1966-1978)

1966

"Artificial Kidney Research" The design and development of the Hollow Fiber Artificial Kidney: Animal Studies and First Human Dialyses
The Dow Chemical Co.: \$25,000

1967

"Artificial Lung Development" The design and development of the first capillary artificial lung. The Hartford Co.: \$30,000

1968

"The Effects of Carbon Monoxide on Human Behavior and Performance"
Coordinating Research Council: \$70,000

"Facility Development" (Partial Funding for 3rd Floor Addition to A-BMSL)
Allen-Bradley Foundation, Inc.: \$20,000

1969

"The Effects of Carbon Monoxide on Human Behavior and Performance"
Coordinating Research Council: \$70,000 (2nd year)

1970

"The Effects of Carbon Monoxide on Human Behavior and Performance"
Coordinating Research Council: \$70,000 (3rd year)

"Study to Determine the Range of Carboxyhemoglobin in Various Segments of the American Population"
Coordinating Research Council: \$75,000

1971

"The Effects of Carbon Monoxide on Human Behavior and Performance"
Coordinating Research Council: \$70,000 (4th year)

"Study to Determine the Range of Carboxyhemoglobin in Various Segments of the American Population"
Coordinating Research Council: \$75,000 (2nd year)

"Evaluation of Automobile Restraint Bag Carbon Monoxide Hazard"
Thiokol Chemical Co.: \$25,000

1972

"The Effects of Carbon Monoxide on Human Behavior and Performance"
Coordinating Research Council: \$66,000 (5th year)

"Study to Determine the Range of Carboxyhemoglobin in Various Segments of the American Population"
Coordinating Research Council: \$75,000 (3rd year)

"Evaluation of Automobile Restraint Bag Carbon Monoxide Hazard"
Thiokol Chemical Co.: \$25,000 (2nd year)

"Development and Evaluation of a Physiologic Readiness-to-Drive Tester"
General Motors Corp.: \$75,000

"Experimental Human Exposure to Propylene Glycol Dinitrate"
U. S. Navy: \$11,576

"Bioplast Research"
S. C. Johnson and Son, Inc.: \$1,000

"Special Research Project Support"
The Johnson Wax Fund, Inc.: \$15,000

1973

"Development and Evaluation of a Physiologic Readiness-to-Drive Tester"
General Motors Corp.: \$75,000 (2nd year)

"Experimental Human Exposure to Propylene Glycol Dinitrate"
U. S. Navy: \$24,516 (2nd year)

"Acute and Repetitive Human Exposure to Fluorocarbon-11 and Fluorocarbon-12"
The Cosmetic, Toiletry, and Fragrance Assn., Inc.: \$70,000

"Development of Biological Standards with Breath Analysis"
National Institute for Occupational Safety and Health: \$250,000

"The Epidemiology of Chagas' Disease in Montero, Bolivia"
The Johnson Wax Fund, Inc.: \$15,000

1974

"Acute and Repetitive Human Exposure to Fluorocarbon-11 and Fluorocarbon-12"
The Cosmetic, Toiletry, and Fragrance Assn., Inc.: \$70,000 (2nd year)

"The Absorption, Excretion, and Physiological Effects of Isobutane and Propane on Human Subjects"
The Cosmetic, Toiletry, and Fragrance Assn., Inc.: \$73,000

"Development of Biological Standards with Breath Analysis"
National Institute for Occupational Safety and Health: \$250,000 (2nd year)

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"The Epidemiology of Chagas' Disease in Montero, Bolivia"
The Johnson Wax Fund, Inc.: \$15,000 (2nd year)

"Artificial Lung-Clinical Research"
National Institutes of Health (UW-M): \$3,500

"Facilities Development" (Partial funding for Environmental Medicine Addition to A-BMSL)
Allen-Bradley Foundation, Inc.: \$100,000

1975

"The Absorption, Excretion, and Physiological Effects of Isobutane and Propane on Human Subjects"
The Cosmetic, Toiletory, and Fragrance Assn., Inc.: \$73,000 (2nd year)

"Research Study to Determine the 1970-1974 Trend in Carboxyhemoglobin Saturation in Blood Donors in Chicago and St. Louis"
Coordinating Research Council: \$28,000

"Carboxyhemoglobin Levels in Mexico City"
Pan American Health Organization: \$15,000

"Development of Biological Standards with Breath Analysis"
National Institute for Occupational Safety and Health: \$250,000 (3rd year)

"Development of a Rapid System of Medical Surveillance for Fire Fighters"
The Johnson Wax Fund, Inc.: \$20,000

1976

"Perchloroethylene/Drug/Alcohol Interaction"
National Institute for Occupational Safety and Health: \$132,000

"Capital Projects Support (Clinical Toxicology Facility)"
The Johnson Wax Fund, Inc.: \$25,000

"Development of a Rapid System of Medical Surveillance for Fire Fighters"
The Johnson Wax Fund, Inc.: \$20,000 (2nd year)

1977

"Effects of Low Levels of Carbon Monoxide on Cardiac Function"
Coordinating Research Council: \$100,000

"Capital Projects Support (Clinical Toxicology Facility)"
The Johnson Wax Fund, Inc.: \$25,000 (2nd year)

"Development of a Rapid System of Medical Surveillance for Fire Fighters"
The Johnson Wax Fund, Inc.: \$20,000 (3rd year)

"Methyl Salicylate Study"
S. C. Johnson and Son, Inc.: \$1,000

1978

"The Cardiovascular Response to Elevated Carboxyhemoglobin Levels"
Coordinating Research Council: \$50,000

"Experimental Human Exposure to Halon 1301"
E. I. DuPont De Nemours and Co.: \$23,500

"The Epidemiology of Chagas' Disease in Central Argentina"
The Johnson Wax Fund, Inc.: \$50,000 from funds previously committed to Capital Projects support.
Ceras Johnson, Argentina: \$30,000 support commitment for transportation and housing of volunteer personnel in Argentina.

"Development of a Rapid System of Medical Surveillance for Fire Fighters"
The Johnson Wax Fund, Inc.: \$20,000 (4th year)

Past Professional Activities:

Committee on Toxicology of the National Research Council, National Academy of Sciences (1971-75)
Sub-Committee on Atmosphere Quality Standards for Long-Duration Manned Space Flights
Member, Commission on Safe Transportation, State Medical Society of Wisconsin (1971)
Consultant to the United States Department of Transportation (1971)
Committee of Occupational Toxicology, American Medical Association (1972)
Bureau of Community Environmental Management of the Public Health Service, Ad Hoc Committee to establish a safe limit for carbon monoxide concentrations in homes, institutions, and other places of occupancy (1972)
Consultant Toxicology Committee, American Industrial Hygiene Association (1969-73)
Technical Advisory and Coordinating Research Committee, Southeastern Wisconsin Regional Planning Commission (1974-75)
Consultant to the Minister of Environmental Improvement, Mexico, sponsored by Pan American Health Organization (1975)
Science and Technology Utilization Council of the City of Milwaukee (1975-76)
Consultant in Toxicology to Vice Admiral D. L. Custis, The Surgeon General of the Navy (1973-76)
TLV Committee, American Conference of Governmental Industrial Hygienists, Inc. (1978-80)
Advisory Medical Staff, Milwaukee Fire Department (1975-80)
Director and Co-Host WFMR's Medicine and the Arts, a weekly program dedicated to exploring the influence of medicine on music, art and history (1977-80).
Consultant in Toxicology and Occupational Medicine to Vice Admiral W. P. Arentzen, The Surgeon General of the Navy (1977-78)

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Consultant to the National Institute for Occupational Safety and Health
(1974-78)
Consultant to the Department of Labor (1973-78)
Editor, Environmental Medicine Section, Practice of Medicine, Harper & Row
(1974-79).
Editorial Board, Toxicology and Applied Pharmacology (1975-78)
Editorial Board, The Journal of Fire and Flammability--Combustion Toxicology
Supplement (1975-78)
Editorial Board, A.M.A. Archives of Environmental Health (1976-78).

Editor, Environmental Medicine Section, Practice of Medicine, Harper & Row
(1974-79)
Editorial Board, Toxicology and Applied Pharmacology (1975-78)
Editorial Board, The Journal of Fire and Flammability--Combustion Toxicology
Supplement (1975-78)
Editorial Board, A.M.A. Archives of Environmental Health (1976-78)

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PUBLICATIONS

- Merchant, D. J., Stewart, R. D., Kempe, L. L., and Graikoski, J. T.: "Use of Tissue Culture Mediums Sterilized with Gamma Radiation from Cobalt-60," Proceedings of the Society for Experimental Biology and Medicine, 86:128-131, 1954.
- Stewart, R. D., Erley, D. S., Torkelson, T. R., and Hake, C. L.: "Post-Exposure Analysis of Organic Compounds in the Blood by a Rapid Infrared Technique," Nature, 184:192-193, (July), 1959.
- Stewart, R. D., Erley, D. S., Skelly, N. E., and Wright, N.: "Infrared Analysis of Blood Serum, Red Blood Cells and Other Body Fluids," J. Lab. Clin. Med., 54:644-658, (Oct.), 1959.
- Stewart, R. D., and Gohlke, R. S.: "The Analysis of Volatile Compounds in the Blood by Conventional Mass Spectrometry," The U. Mich. Med. Bulletin, 26:110-116, (April), 1960.
- Stewart, R. D., Torkelson, T. R., Hake, C. L., and Erley, D. S.: "Infrared Analysis of Carbon Tetrachloride and Ethanol in Blood," J. Lab. Clin. Med., 56:148-156, (July), 1960.
- Stewart, R. D., Skelly, N. E., and Erley, D. S.: "Infrared Analysis of Serum Protein from One Hundred and Five Healthy Adults," J. Lab. Clin. Med., 56:391-400, (Sept.), 1960.
- Stewart, R. D., Gay, H. H., Erley, D. S., Hake, C. L., and Schaffer, A. W.: "Human Exposure to Tetrachloroethylene Vapor: Relationship of Expired Air and Blood Concentrations to Exposure and Toxicity," Arch. Environ. Health, 2:516-522, (May), 1961.
- Stewart, R. D., and Erley, D. S.: "Comparative Infrared Spectra of Vertebrate Red Blood Cells," Exp. Cell. Res., 23:460-470, (Aug.), 1961.
- Stewart, R. D., Erley, D. S., Schaffer, A. W., and Gay, H. H.: "Accidental Vapor Exposure to Anesthetic Concentrations of a Solvent Containing Tetrachloroethylene," Ind. Med. Surg., 30:327-330, (Aug.), 1961.
- Stewart, R. D., Gay, H. H., Erley, D. S., Hake, C. L., and Schaffer, A. W.: "Human Exposure to 1,1,1-Trichloroethane Vapor: Relationship of Expired Air and Blood Concentrations to Exposure and Toxicity," Am. Ind. Hyg. Assoc. J., 22:252-262, (Aug.), 1961.
- Stewart, R. D., Boettner, E. A., and Stubbs, B. T.: "Rapid Infrared Determination of Acetone in the Blood and the Exhaled Air of Diabetic Patients," Nature, 191:1008-1009, (Sept.), 1961.
- Stewart, R. D., Gay, H. H., Erley, D. S., Hake, C. L., and Peterson, J. E.: "Human Exposure to Carbon Tetrachloride Vapor: Relationship of Expired Air Concentration to Exposure and Toxicity," J. Occup. Med., 3:586-590, (Dec.), 1961.
- Stewart, R. D., and Sanislow, C. A.: "Silastic Intravenous Catheter," N. Engl. J. Med., 265:1283-1285, (Dec.), 1961.
- Stubbs, B. T., Stewart, R. D., and Boettner, E. A.: "Infrared Analysis of Dicumarol in Blood Serum," J. Lab. Clin. Med., 59:667-671, (April), 1962.
- Stewart, R. D., Gay, H. H., Erley, D. S., Hake, C. L., and Peterson, J. E.: "Observations on the Concentration of Trichloroethylene in Blood and Expired Air Following Exposure of Humans," Am. Ind. Hyg. Assoc. J., 23:167-170, (April), 1962.
- Stewart, R. D., and Erley, D. S.: "Detection and Toxic Compounds in Humans and Animals by Rapid Infrared Techniques," J. Forensic Sci., 8:31-45, (Jan.), 1963.
- Stewart, R. D., Boettner, E. A., Southworth, R. N., and Cerny, J. C.: "Acute Carbon Tetrachloride Intoxication," JAMA, 183:994-997, (March), 1963.
- Stewart, R. D.: "The Toxicology of Methyl Chloroform," J. Occup. Med., 5:259-262, (May), 1963.
- Erley, D. S., and Stewart, R. D.: "Emergency Room Infrared Spectroscopic Analysis," Arch. Intern. Med., 111:656-660, (May), 1963.
- Stewart, R. D., Swank, J. D., Roberts, C. B., and Dodd, H. C.: "The Detection of Halogenated Hydrocarbons in the Expired Air of Humans Using the Electron Capture Detector," Nature, 198:696-697, (May), 1963.
- Stewart, R. D. and Erley, D. S.: "Infrared Spectroscopy in Medical Diagnosis," Analyzer, 4:1-3, (Nov.), 1963.
- Rowe, V. K., Mukjowski, T., Wolf, M. A., Sadek, S. E., and Stewart, R. D.: "Toxicity of a Solvent Mixture of 1,1,1-Trichloroethane and Tetrachloroethylene as Determined by Experiments on Laboratory Animals and Human Subjects," Am. Ind. Hyg. Assoc. J., 24:541-554, (Nov.-Dec.), 1963.
- Stewart, R. D., Sadek, S. E., Swank, J. D., and Dodd, H. C.: "Diagnosis of Trichloroethylene Exposure After Death," Arch. Pathol., 77:101-104, (Jan.), 1964.

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- Stewart, R. D., and Boettner, E. A.: "Expired Air Acetone in Diabetes Mellitus," N. Engl. J. Med., 270:1035-1038, (May), 1964.
- Stewart, R. D., Cerny, J. E., and Mahon, H. I.: "The Capillary Kidney," U. Mich. Med. Center J., 30:116-118, (May-June), 1964.
- Stewart, R. D., and Dodd, H. C.: "Absorption of Carbon Tetrachloride, Trichloroethylene, Tetrachloroethylene, Methylene Chloride, and 1,1,1-Trichloroethane Through the Human Skin," Am. Ind. Hyg. Assoc. J., 25:439-446, (Sept.-Oct.), 1964.
- Stewart, R. D., and Mahon, H. I.: "Research on the Capillary Kidney," Proceedings of the Conference on Hemodialysis, Public Health Service Publication No. 1349-221-227, (Nov.), 1964.
- Stewart, R. D., and Erley, D. S.: "Detection of Volatile Organic Compounds and Toxic Gases in Humans by Rapid Infrared Techniques," Progress in Chemical Toxicology, Vol. 1, pp. 183-220, Academic Press, New York, 1965.
- Stewart, R. D.: "The Evolution of the Industrial Physician - Ascent or Decline?" Ind. Med. Surg., 34:39-42, (Jan.), 1965.
- Stewart, R. D.: "Improved Neurological Hammer," JAMA, 193:774, (Aug.), 1965.
- Stewart, R. D., Dodd, H. C., Erley, D. S., and Holder, B. B.: "The Diagnosis of Solvent Poisoning," JAMA, 193:1097-1100, (Sept.), 1965.
- Stewart, R. D., and Batdorf, D. B.: "Slotted Needle for Catheter Introduction," Arch. Surg., 92:310, (Feb.), 1966.
- Stewart, R. D., and Andrews, J. T.: "Acute Intoxication With Methylchloroform," JAMA, 195:904-906, (March 14), 1966.
- Stewart, R. D., Baretta, E. D., Cerny, J. E., and Mahon, H. I.: "An Artificial Kidney Made from Capillary Fibers," Invest. Urology, 3:614-624, (May), 1966.
- Stewart, R. D.: "Quinze ans d'Etudes sur le 1,1,1-Trichloroethane," Arch. Mal. Professionnelles, 28:194-201, 1967.
- Stewart, R. D.: "Chlorinated Hydrocarbon Solvent Poisoning," Am. J. Nurs., 67: No. 1, (Jan.), 1967.
- Lipps, B. J., Stewart, R. D., Perkins, H. A., Holmes, G. W., McLain, E. A., Rolfs, M. R., and Oja, P. D.: "The Hollow Fiber Artificial Kidney," Trans. Am. Soc. Artif. Intern. Organs, 13:200-207, 1967.
- Stewart, R. D., Cerny, J. E., and Lipps, B. J.: "Hemodialysis with the 'Capillary Kidney'," U. Mich. Med. Center J., 34:80-83, (March-April), 1968.
- Stewart, R. D., Dodd, H. C., Baretta, E. D., and Schaffer, A. W.: "Human Exposure to Styrene Vapor," Arch. Environ. Health, 16:656-662, (May), 1968.
- Stewart, R. D., Lipps, B. J., Baretta, E. D., Piering, W. F., and Roth, D.: "Short-Term Hemodialysis with the Capillary Kidney," Trans. Am. Soc. Artif. Intern. Organs, 14:121-125, (June), 1968.
- Stewart, R. D.: "Toxicology of 1,1,1-Trichloroethane," Ann. Occup. Hyg., 11:71-79, 1968.
- Stewart, R. D.: "Die Toxikologie von 1,1,1-Trichloroethan," Zentralbl. Arbeitsmed., 18:262-266, (Sept.), 1968.
- Baretta, E. D., Stewart, R. D., and Mutchler, J. E.: "Monitoring Exposures to Vinyl Chloride Vapor: Breath Analysis and Continuous Air Sampling," Am. Ind. Hyg. Assoc. J., 30:537-544, (Nov.-Dec.), 1969.
- Stewart, R. D., and Baretta, E. D.: "Artificial Capillary Lung," U. Mich. Med. Center J., 34:194-196, (July-Sept.), 1968.
- Stewart, R. D.: "Acute Tetrachloroethylene Intoxication," JAMA, 208:1490-1492, (May 26), 1969.
- Stewart, R. D., Gay, H. H., Schaffer, A. W., Erley, D. S., and Rowe, V. K.: "Experimental Human Exposure to Methyl Chloroform Vapor," Arch. Environ. Health, 19:467-472, (Oct.), 1969.
- Stewart, R. D., Baretta, E. D., Dodd, H. C., and Torkelson, T. R.: "Experimental Human Exposure to the Vapor of Propylene Glycol Monomethyl Ether," Arch. Environ. Health, 20:218-223, (Feb.), 1970.
- Stewart, R. D., Gay, H. H., Erley, D. S., and Dodd, H. C.: "Experimental Human Exposure to Trichloroethylene," Arch. Environ. Health, 20:64-71, (Jan.), 1970.
- Stewart, R. D., Baretta, E. D., Dodd, H. C., and Torkelson, T. R.: "Experimental Human Exposure to Tetrachloroethylene," Arch. Environ. Health, 20:224-229, (Feb.), 1970.
- Stewart, R. D., Peterson, J. E., Baretta, E. D., Dodd, H. C., Hosko, M. J., and Herrmann, A. A.: "Experimental Human Exposure to Carbon Monoxide," Arch. Environ. Health, 21:154-164, (Aug.), 1970.

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- Peterson, J. E., and Stewart, R. D.: "Absorption and Elimination of Carbon Monoxide by Inactive Young Men," Arch. Environ. Health, 21:165-171, (Aug.), 1970.
- Stewart, R. D., Fisher, I. N., Peterson, J. E., Hosko, M. J., Baretta, E. D., Dodd, H. C., Newton, P. E., and Herrmann, A. A.: "Experimental Human Exposure to Carbon Monoxide," Proceedings of the First Annual Conference on Environmental Toxicology, 9-11 September, 1970, Aerospace Medical Research Laboratory, Publication No. AMRL-TR-70-102, pp. 49-75, (Dec.), 1970.
- Stewart, R. D.: "Clinical Toxicology: Outline of General Principles," J. Occup. Med. 13:19-21, (Jan.), 1971.
- Stewart, R. D.: "Methyl Chloroform Intoxication: Diagnosis and Treatment," JAMA, 215:1789-1792, (March 15), 1971.
- Stewart, R. D., Fisher, I. N., Hosko, M. J., Peterson, J. E., Baretta, E. D., and Dodd, H. C.: "Carboxyhemoglobin Elevation After Exposure to Dichloromethane," Science, 176:295-296, (April 21), 1972.
- Stewart, R. D.: "1,1,1-Trichloroethane," Occupational Health and Safety, Vol. II, pp. 1432-1433, International Labour Office, Geneva, 1972.
- Stewart, R. D.: "The Use of Human Volunteers for the Toxicological Evaluation of Materials," Symposium on an Appraisal of Halogenated Fire Extinguishing Agents, Washington, D. C., April 11-12, 1972.
- Stewart, R. D., Peterson, J. E., Hosko, M. J., Baretta, E. D., Dodd, H. C., Newton, P. E., and Herrmann, A. A.: "Effect of Carbon Monoxide Upon Human Performance," Transactions of the Rochester Symposium on Behavioral Psychology, May, 1972.
- Stewart, R. D.: "Breath Analysis in Biologic Threshold Limits," Proceedings of the Seventeenth International Congress on Occupational Health, Buenos Aires, Argentina, August, 1972.
- Stewart, R. D.: "Breath Analysis in Biologic Threshold Limit Determination," Proceedings of the Third Annual Conference on Environmental Toxicology, 25-27 October, 1970, Aerospace Medical Research Laboratory, Publication No. AMRL-TR-72-130, pp. 17-27, 1972.
- Stewart, R. D., Fisher, I. N., Hosko, M. J., Peterson, J. E., Baretta, E. D., and Dodd, H. C.: "Experimental Human Exposure to Methylene Chloride," Arch. Environ. Health, 25:342-348, (Nov.), 1972.
- Stewart, R. D.: "The Capillary Artificial Kidney," Hemodialysis: Principles and Practices, Ed. by G. L. Bailey, Chapt. 12, Academic Press, 1972.
- Stewart, R. D., and Peterson, J. E.: "Human Absorption of Carbon Monoxide from High Concentrations in Air," Am. Ind. Hyg. Assoc. J., pp. 293-297, (May), 1972.
- Stewart, R. D., Peterson, J. E., Fisher, I. N., Hosko, M. J., Baretta, E. D., Dodd, H. C., and Herrmann, A. A.: "Experimental Human Exposure to High Concentrations of Carbon Monoxide," Arch. Environ. Health, 26:1-7, (Jan.), 1973.
- Stewart, R. D.: "The Health Basis for Carbon Monoxide Standards," Proceedings Automotive Emissions Seminar, Detroit, June 19, 1973.
- Stewart, R. D., Newton, P. E., Hosko, M. J., and Peterson, J. E.: "Effect of Carbon Monoxide on Time Perception," Arch. Environ. Health, 27:155-160, (Sept.), 1973.
- Stewart, R. D., Baretta, E. D., Platte, L. R., Stewart, E. B., Kalbfleisch, J. H., Van Yzerloo, B., and Rimm, A. A.: "Carboxyhemoglobin Concentration in Blood Donors in Chicago, Milwaukee, New York, and Los Angeles," Science, 182:1362-1364, 1973.
- Rytel, M. W., Stewart, R. D., and Rose, H.: "Absence of Circulating Interferon in Patients with Malaria and with American Trypanosomiasis," Proceedings of the Society of Experimental Biology & Medicine, 144:122-123, (Oct.), 1973.
- Stewart, R. D.: "The Use of Breath Analysis in Clinical Toxicology," Essays in Toxicology, Ed. by W. Hayes, Vol. V, Chapt. 5, Academic Press, 1974.
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PATENT DISCLOSURES

Richard D. Stewart, M. D.

1. New Solvents for Polyacrylonitrile and Copolymers Thereof, Disclosure 7895, Received 10-3-52 -- Dropped 11-6-53; Co-inventors: D. H. Clarke, and A. F. Roche.
2. Ear Protector - U. S. Patent No. 2,910,980; Issued 11-3-59.

This invention describes a method of ear protection which utilizes a foamed-in-place Silicone rubber for the pinna of the ear, which prevents the entrance of sound waves or liquids into the external auditory canal.

3. Breath Sampling Pipette, Disclosure No. 17716, 2-23-65; Case 10993; filed in U. S. Patent Office, 3-1-65.
4. Improved Intravenous Catheter, Disclosure No. 16217, 7-17-63. Case 10985; filed in U. S. Patent Office, 3-17-65.

Canadian Patent, No. 808, 984; Issued 3-25-69; Italian Patent No. 765, 670; French Patent No. 1,483, 989; Belgian Patent No. 680,806; Swiss Patent No. 454,363. Co-inventor: D. Batdorf.

5. Improved Body Organ Apparatus - U. S. Patent No. 3,373,876, issued March 19, 1968.

This invention describes the hollow fiber artificial kidney and the artificial capillary lung.

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RESUME of ALEXANDER WHITE SPEARS III

SPEARS, Alexander White, III: Executive Vice President, Operations and Research; Lorillard, A Division of Loews Theatres, Inc.; 2525 East Market Street, Greensboro, N. C. 27401. RESIDENCE: 3513 Henderson Road, Greensboro, N. C. 27410; PLACE OF BIRTH: Grindstone, Pa. (Sept. 29, 1932); EDUCATION: B.S. Allegheny College, 1953, Ph.D. State University of New York at Buffalo, 1960; MARRIED: Shirley Spears; EXPERIENCE: Research Associate, State University of N.Y. at Buffalo, 1956-58; Research Fellow, State University of N.Y. at Buffalo, 1958-59; Instructor at Millard Fillmore College, 1958-59; Research Associate, P. Lorillard Co., 1959-61; Asst. Professor at Guilford College, 1961-65; Senior Research Chemist, P. Lorillard Co., 1961-65; Director of Basic Research, P. Lorillard Co., 1965-68; Director, Research and Development, Lorillard, A Div. of Loews Theatres, Inc., 1968-71; Vice President, Research and Development, Lorillard, 1971-75; Senior Vice President, Operations and Research, Lorillard, 1975-79; Executive Vice President, Operations and Research, Lorillard, 1979-Present. PROFESSIONAL MEMBERSHIPS: American Chemical Society, Society for Applied Spectroscopy, Plant Phenolic Group of North America, Coblenz Society, American Management Association, New York Academy of Science, Sigma Xi, ASTM, Scientific Commission of CORESTA (International Cooperative Center for Scientific Research Relative to Tobacco - 1972-1976). CONTRIBUTIONS: 25 publications in patent and scientific literature. CURRENT COMMUNITY ACTIVITIES: Board of Directors, United Way of Greater Greensboro, Inc.; Member of the North Carolina Humanities Committee, 1978-Present; Board of Directors, Greensboro National Bank.

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BIOGRAPHY

John F. Krasny

EXPERIENCE:

Textile Technologist, Center for Fire Research, National Bureau of Standards, Washington, D. C. Work on development of flammability test methods for general apparel, upholstered furniture, and protective clothing.

Group Leader, Harris Research Laboratory Division, Gillette Research Institute, Rockville, Maryland, 1951-1972. Contract research and development for the fiber, textile, and chemical industry and the U. S. government.

Various positions in textile manufacture, testing, and research in the U. S. and Central Europe, 1936-1941, 1945-1951.

EDUCATION:

B.S. in Physics, University of Denver, 1948.

B. S. in Statistics, American University, 1958.

Diploma, European Textile Schools, 1936.

Born in Vienna, Austria, October 1914.

MILITARY SERVICE: U. S. Army, Infantry and Military Intelligence Service (Interrogator of German Prisoners, European Theater of War), 1941-1945

MEMBERSHIPS: American Association for the Advancement of Science;
American Association of Textile Chemists and Colorists;
American Physical Society;
American Society for Testing and Materials;
Cellulose Section of the American Chemical Society;
Fiber Society;
Information Council on Fabric Flammability;
National Fire Protection Association;
National Smoke, Fire, and Burn Institute

PUBLICATIONS: About 65 publications, of which 35 are in the area of flammability and protective clothing. Two patents.

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ARTHUR C. DELIBERT

Bar Memberships: New York State and the District of Columbia.

Legal Education: New York University Law School, J.D. degree, June 1978.

Activities: Editor, Moot Court Board; Alternate Member, National Moot Court Team, 1977.

Pre-legal Education: Cornell University, B.S. degree in electrical engineering, June 1968.

Honors: Tau Beta Pi (engineering honorary).
Eta Kappa Nu (electrical engineering honorary).

Activities: Watermargin House (cooperative living unit with interracial and international emphasis): President, 1967-68; Vice-president, 1966-67.

Employment History

Citizens Committee for Fire Protection
2000 P Street N.W.
Washington, D.C. 20036

President, March 1982 to date. Responsible for substantive, administrative, and fund-raising activities of a new public interest group established to press for changes in public policies related to America's excessive fire losses.

U.S. Securities and Exchange Commission
450 Fifth Street N.W.
Washington, D.C. 20549

Legal Assistant to Commissioner Barbara S. Thomas, October 1980 to February 1982. Principal aide to Commissioner of a major federal regulatory agency. Analyzed and discussed with Commissioner many proposed court cases, administrative proceedings and rulemaking actions which staff presented to Commission for approval; prepared Commissioner's speeches, articles, and other public statements; and assisted Commissioner with congressional relations, staff liaison, and office operations.

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Employment History (continued):

Staff Attorney, Office of the General Counsel,
October 1978 to October 1980. Responsible for review and legal analyses of court actions and administrative rulemaking proposed to the Commission by various staff divisions. Frequently prepared short memoranda to the Commission exploring selected aspects of proposed cases; prepared in-depth memoranda exploring issues of unusual or recurring importance; and appeared at Commission meetings to present the position of the Office of the General Counsel. Also analyzed requests for release of information under the Freedom of Information Act and, occasionally, prepared appellate briefs. Performance rating: Outstanding.

New York University
School of Law
40 Washington Square South
New York, New York 10012

Research Assistant to Professor Robert C. Pozen,
April to November, 1977. Research, proofreading, and some editing for new law school text, Financial Institutions: Cases, Materials & Problems on Investment Management, West Publishing Co., 1978.

Center for Auto Safety
1223 Dupont Circle Building
Washington, D.C. 20036

Associate Director, May 1974 to August 1975. Second in charge of a public interest auto safety group with a staff of 14 and an annual budget of \$250,000. Served approximately three months as Acting Director.

Staff Engineer, September 1971 to May 1974. Responsible for several projects or portions of projects requiring technical analysis, including studies of highway design and snowmobile safety.

Selected Reports and Articles:

Civil Liability for Arson Fires (a study of owners' liability for fires in vacant and partially-occupied structures), to be released shortly by the Battelle Memorial Institute.

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Reports and Articles (continued):

"Preventing Fires in America's Inner Cities," Ways and Means, May/June 1983 (lead article).

"The Long, Unfinished Fire Agenda of the Consumer Product Safety Commission," The International Fire Chief, April 1983.

"What's Wrong With Highway Engineering," Traffic Engineering, May 1975.

The Yellow-Book Road -- The Failure of America's Roadside Safety Program, Center for Auto Safety, 1974 (an in-depth study of the neglect of safety in the federal-aid highway program, focusing on the complex interaction between the Federal Highway Administration and the various state highway departments; principal author).

Other Qualifications and Associations:

Member, National Fire Protection Association.

Member of the Takoma Park, Maryland, Volunteer Fire Department.

Emergency Medical Technician (Ambulance), certified by the State of Maryland.

References: Available upon request.

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PHILIP S. SCHAENMAN

Education: B.S., Engineering and Liberal Arts, Queens College, 1961,
magna cum laude
B.S., Electrical Engineering, Columbia University, 1961
M.S., Electrical Engineering, Stanford University, 1962
Professional Degree of Electrical Engineer, Columbia
University, 1963

Experience:

Mr. Schaenman is President and Founder of TriData Corporation of Arlington, Virginia, which specializes in information systems and data analysis for government and industry, especially in fire protection. He is an expert in fire data analysis and advises many industries and fire departments as well as the federal government. He is a Member of the NFPA's Fire Reporting Standards Committee.

From 1976-1981, he was Associate Administrator of the U.S. Fire Administration and head of the National Fire Data Center. He was responsible for the development of the National Fire Incident Reporting System and for the national estimates of the fire problem. Before becoming Associate Administrator, Mr. Schaenman founded and headed the Analysis and Evaluation Division in the Fire Administration.

Mr. Schaenman was the coauthor and manager for the series of data reports, Fire in the United States. He taught fire data analysis at the National Fire Academy to over 500 Fire chiefs and developed materials for the data portion of its Executive Development III course. He wrote the data chapter in Managing Fire Services, published by the International City Management Association.

Mr. Schaenman previously was a senior research associate at The Urban Institute, and was head of various groups at Bellcomm, Inc., which worked on data information systems issues in the manned spaceflight program and in corporate management for AT&T.

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INTERNATIONAL ASSOCIATION OF FIRE CHIEFS
AD HOC COMMITTEE

on
"Fire Safe Cigarettes"

American Health Foundation Offices
320 East 43rd Street
New York, N.Y. 10017
(212) 953-1900

AGENDA

- 8:30 - 9:30 a.m. - Committee to meet in executive session. (To get to know each other and each one to give a short synopsis of relative research done with results, opinions and conclusions).
- 9:30 - 11:30 a.m. - Four technical experts to be heard (all in the room during the presentations).
- 11:30 - 12 noon - Executive session.
- Noon to 12:45 p.m. - Lunch served in American Health Foundation building.
- 12:45 - 2:30 p.m. - Resume - executive session.
- 2:30 - 3:30 p.m. - Technical experts to return for any additional questions to be answered or information needed.
- 3:30 - 4:30 p.m. - Resume - executive session to further consider the testimony of all parties.
- 4:30 p.m. - Adjourn.

To both Committee Members and Technical Experts:

We invite slides or overhead plates as part of a presentation, but a copy of any written or canned presentation is to be given to each of the six committee members for future reference.

To Technical Experts:

Your presentation has to be limited to 30 minutes, including time for questions from the committee members.

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IAFC SPECIAL COMMITTEE ON SELF-EXTINGUISHING CIGARETTES

BACKGROUND

At the Annual Meeting of the IAFC in Atlanta in August 1983, the membership passed a resolution in support of the concept of self-extinguishing cigarettes. It was further decided to establish a special committee to look into the technical issues associated with self-extinguishing cigarettes and to provide its findings and recommendations to the IAFC.

Chief William Stamm was appointed by the IAFC President, Doug Pollington, to establish and chair the committee.

The United States has the highest fire death rate in the world, and smoking-related fires are the leading cause of fire deaths. Many people in the fire service feel that if a cigarette could be made in a way that reduces the chance to start a fire when carelessly used or dropped, many of the deaths could be prevented. Since some existing cigarettes seem to go out much faster than others, why can't this feature be built into all cigarettes?

The tobacco industry says it is concerned about the fires involving cigarettes, and agrees that there are far too many. But it says that it has tried without success to make a self-extinguishing cigarette that does not have increased tar and nicotine. The industry claims that further research is needed to see if there is a solution, and that it would like to see one. The industry also says that it currently does not know how to make a reliable self-extinguishing cigarette that is acceptable to smokers and that will significantly reduce the chances of starting a fatal fire, though it says that, too, may be possible to do with further research. However, proponents of self-extinguishing legislation argue that the industry already does make some.

Some fire chiefs believe that the introduction of self-extinguishing cigarettes might increase chances of starting fires because of the need to

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have more matches convenient for relighting cigarettes accessible to children, elderly and infirmed people having to constantly light a cigarette, and because of a letdown on the carefulness of smokers who may think the new product is totally safe. The fire service wants to reduce fire deaths, but must be reasonably certain that any proposed cure won't do more harm than good.

We need to review the facts on both sides to make an intelligent decision in the interest of public safety.

CHARGE

The charge to this committee is to impartially review the available facts; determine whether the self-extinguishing concept does or does not seem like a good idea with present knowhow; determine what further information is needed, if any, to make a decision; and to recommend a course of action for the IAFC. Specifically:

1. Is the technology available to produce a reliably self-extinguishing cigarette? Even better, are there current cigarettes that fill the bill?
2. If a self-extinguishing cigarette was produced, would it significantly reduce the number of cigarette-related fire deaths?
3. Are there unwanted negative effects of self-extinguishing cigarettes, such as an increase in fire hazards or from increased tar and nicotine?

For each of these questions, the committee will review the available written technical information and listen to technical "experts."

Based on its findings, the committee will recommend a course of action for the IAFC, such as more strongly endorsing the concept of self-extinguishing, endorsing legislation of standards for the tobacco industry to meet, endorsing (and possibly lending its assistance to) further study and testing, or other actions. The committee will provide for the IAFC membership a summary of the facts it reviewed and a list of the experts it heard. The committee itself will not undertake any research. If the committee feels that there are major gaps in the availability or credibility of existing information, it will point that out and make appropriate recommendations, such as the need for specific types of further testing.

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COMPOSITION OF THE COMMITTEE

It is important to have an objective group of people on the committee, including members who are competent to review the complex technical issues, and excluding any whose mind is already made up. The composition proposed at the Atlanta IAFC meeting was two fire chiefs (one a smoker and one a non-smoker, two medical doctors, and two fire scientists). The following individuals are proposed:

Chief William Stamm, Milwaukee Fire Department - Chairman

Chief John Hart, New York City Fire Department

Ed Clougherty, Chemist, Boston Fire Department

Richard Custer, Associate Director, Center for Fire Safety Studies,
Worcester Polytechnic Institute

Dr. Dietrich Hoffman, American Health Foundation, New York City, and
National Cancer Institute

Dr. Richard D. Stewart, Corporate Medical Director, S.C. Johnson Company,
Racine, Wisconsin

Mr. Clougherty is one of the only chemists serving as a member of a fire department, and has worked on numerous national projects involving firefighter safety and fire research. Mr. Custer helps run the only graduate program in fire protection engineering, and was formerly a fire research scientist at the Center for Fire Research at the National Bureau of Standards. Dr. Hoffman is one of the leading researchers on the health effects of tar and nicotine. Dr. Stewart is a public health specialist and toxicity expert as well as a physician, and has done extensive fire-related research.

Technical experts from the tobacco industry will not be part of the committee, but will be asked to provide technical information. Dr. Spears, Senior Vice President of Lorillard, has been proposed by the industry as their contact for information, in response to the committee's request to the industry. He gave technical testimony to Congress on the approaches to self-extinguishing and was a tobacco research chemist for much of his career.

OUTLINE OF PROJECT

The following steps are planned:

The chairman will send each committee member a list of the issues to be discussed. Some of the specialists on the committee will be asked to focus on particular areas.

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The chairman will be responsible for identifying relevant data, articles, and technical reports and will supply copies to the committee. Committee members will review this material and gather further information on their own as each feels is appropriate.

A meeting will be held for the committee to review its findings and interview experts as a group. The meeting will be held in New York City to minimize travel costs given the geographical location of the members. The members will be expected to have reviewed all materials and to summarize for the others the information they have acquired independently.

Technical experts to be interviewed at the meeting will include John Krasny from the National Bureau of Standards, Dr. Spears from the tobacco industry, and possibly others.

If, at the end of the meeting, the committee feels the information is adequate to make a decision, it will prepare and recommend an official position for the IAFC to adopt. It will also recommend specific government relations activities for IAFC if it's called for. If it is felt that more information is needed, the chairman will be responsible for getting it and distributing it to the members. (Since there are no travel funds allocated for these meetings, they need to be held to a minimum number.)

After the last meeting, the chairman will arrange to have the findings and recommendations documented, and will have documents and minutes reviewed by the committee and presented to the IAFC Executive Committee. The meetings should be completed prior to February 1, 1984 and the documentation made available by April 1, 1984. This will be the basis for further discussion at the next Metro Chiefs and the IAFC annual meetings.

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IAFC AD HOC COMMITTEE ON FIRE SAFE CIGARETTES

New York City - November 16, 1983

Points to be Cleared Up

Data

1. What is the magnitude and nature of the part of the fire problem involving cigarettes and other smoking materials?

(This includes number of fires, deaths, injuries, dollar loss; typical fire scenarios; reliability of the available data; trends over the last five years; 1982 update.)

Alternative Approaches

2. What are the alternative approaches to reducing smoking-related fires and fire losses?

(This includes alterations to the cigarette; behavioral education; improving fire resistivity of the environment; use of detectors and sprinklers; and other ideas.)

Cigarette Technology and Self-extinguishing Issues

3. What are "self-extinguishing" cigarettes?

(This includes the issues of their time to extinguish in order to be called self-extinguishing; their reliability of going out within a certain time; the ways in which a cigarette can be made self-extinguishing; and whether removing additives will lead to self-extinguishment.)

4. Are any existing brands of cigarettes "self-extinguishing"?

(Proponents of self-extinguishing say yes; what evidence is there? What do NBS, the tobacco industry, and others say?)

5. What is the relationship, if any, between extinguishment time and the propensity to start ignition? What evidence is there that an earlier extinguishment time will materially reduce the number of fires and fire deaths and injuries? What fraction of deaths might be prevented?

(This includes the theory of smoldering ignition; data from the field; test data, if any; upholstered furniture and bedding prevalent among current fire victims, especially in households of the poor and elderly.)

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6. By what criteria can a cigarette be tested to determine its relative fire safety? Is there a reliable test to do so?

(This includes considering how to test in light of the wide variety of upholstered furniture and bedding.)

Side Effects

7. Will tar and nicotine levels be raised by making cigarettes self-extinguishing? By how much? Will that have potential health impacts? What is the risk, if any? How does it compare to potential gains in fire safety?

8. What unwanted fire-related behavior, if any, might be caused by requiring smokers to relight self-extinguishing cigarettes? Will there be any negative impacts on others stemming from the smoker's need to relight more frequently?

(Considerations here include increased use of matches and lighters, increased spread of matches and lighters for smokers' convenience, access by children, decrease in manual dexterity of the elderly.)

9. What unwanted fire safety behavior or attitudes might be caused by calling cigarettes "fire safe."

(Is there any precedent? Is there likely to be any change in people's attitudes toward fire? Will smokers be more careful or careless?)

Adequacy of Information

10. Is the current technical information adequate enough to make a reasonably confident decision regarding the net benefits of self-extinguishing? If not, what other research is needed?

IAFC Position

11. What should the IAFC position be?

(This should include its stance relative to national legislation.)

Chief William Stamm, Chairman

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The following letter was sent to those shown on the attached sheet.



Fire Department

William Stamm
Chief

Richard P. Seelen
Assistant Chief

October 27, 1983

The International Association of Fire Chiefs has formed an Ad Hoc Committee on Fire Safe Cigarettes to determine the pros and cons of "self-extinguishing" cigarettes as they would affect public safety, including consideration of potential side effects, as well as benefits. The Committee will be meeting on November 16 in New York City. I have been asked to serve as its Chairman. The other members are listed as an attachment.

We would like to know if you or your organization has any technical information, data, or other empirical evidence related to the feasibility of making cigarettes self-extinguishing, the likelihood that this will reduce the fire problem, and the likelihood of unwanted side effects from this concept. A fuller list of the questions we are considering is attached.

There have been many opinions heard from proponents and opponents of self-extinguishing cigarettes. We are trying to determine what is really known about this concept -- preferably information of a scientific nature, but short of that, whatever hard evidence is available.

I would appreciate your sending me any information you think would be relevant for us to consider by November 9, so that we may distribute it to the Committee for their review. We regret the short notice, but hope it will be convenient for you to forward materials that are readily available.

Sincerely,

WILLIAM STAMM
Chief

WS:mh
Attachments

517003694

Mr. Andrew McGuire
Executive Director
American Burn Foundation
San Francisco General Hospital
San Francisco, California 94110

Elizabeth McLoughlin
National Association for Public
Health Policy
23 Peasant Way
South Burlington, Vermont 05401

Mr. Peter G. Sparber
Vice President
The Tobacco Institute
1875 "I" Street, NW
Washington, D.C. 20006

Chief Ed Wall
Acting Administrator
U.S. Fire Administration, FEMA
Emmitsburg, Maryland 21727

Chief Kenneth E. Green
President, FASNY
Gloversville Fire Department
Frontage Road
Gloversville, New York 12078

Mr. Robert W. Grant, President
National Fire Protection Association
Batterymarch Park
Quincy, Massachusetts 02269

Ms. Nancy H. Steorts, Chairman
Consumer Product Safety Commission
1111 - 18th Street, NW
Washington, D.C. 20207

Mr. Philip S. Schaenman
President, TriData
1500 Wilson Boulevard
Arlington, Virginia 22209

Lieutenant Tom O'Connell
Chicago Fire Department
Fire Prevention Bureau
444 North Dearborn Street
Chicago, Illinois 60610

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List of Papers Supporting the Tobacco Industry's Research

(Dr. Spear's testimony)

Available from Committee Chairman

Chief William Stamm

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1. A Weight Loss Technique for Determining Rate of Static Burn
2. Natural Smoulder in Cigarettes
3. The Mechanism of Smouldering in Cigarettes
4. Investigation of Some Physico-Chemical Aspects of Cigarette Smoke
5. The Distribution of Gases within the Combustion Coal of a Cigarette
6. Temperature Distribution Inside a Burning Cigarette
7. Investigations on the Effect of Chemical Modifiers on Tobacco and Tobacco Smoke
8. Thermal Decomposition of Tobacco
9. Factors Affecting Static Burning Rate
10. Flame-Retardant Additives as Possible Cancer Hazards
12. NBS Back-Up Report for the Proposed Standard for the Flammability of Upholstered Furniture
13. Furniture Flammability: Fabric Opportunities¹
14. Role of Inorganic Additives in the Smoldering Combustion of Cotton Cellulose
15. Development of a Candidate Test Method for the Measurement of the Propensity of Cigarettes to Cause Smoldering Ignition of Upholstered Furniture and Mattresses
17. Cigarette Ignition Studies by United States Testing Company, Inc. (California Division)
18. Smoldering Characteristics of Fabrics Used as Upholstered Furniture Coverings
19. Flame Retarded Cotton Fabric and Filling Materials
20. Regulatory Clouds Flee from UFAC (Upholstered Furniture Action Council) Skies
21. Statement by Susan B. King, Chairman, Consumer Product Safety Commission
22. Smoldering Characteristics of Cotton Upholstery Fabrics
25. Report No. 1 - Toward Less Hazardous Cigarettes
26. Report No. 4 - Toward Less Hazardous Cigarettes
28. Role of Oxygen Chemisorption in Low-Temperature Ignition of Cellulose
29. Smoldering and Ignition of Cotton Fibres and Dust
30. Cigarettes and Upholstered Furniture
31. UFAC - Voluntary Action Program Chair Tests
32. A FEMA View of the 1981 US Fire Problem
33. A Survey of Several Factors Influencing Smoldering Combustion in Flexible and Rigid Polymer Foams
34. Smoldering in Cotton Upholstery Fabrics and Fabric/Cushioning Assemblies

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NBS OBJECTIVES :

- ESTABLISH FEASIBILITY OF A TEST METHOD FOR THE PROPENSITY OF CIGARETTES TO IGNITE UPHOLSTERED FURNITURE AND MATTRESSES
- NOT TO RATE BRANDS OF CIGARETTES
- OUTDOOR FUEL (DRIED GRASS, LEAVES, PINE NEEDLES) WERE NOT INCLUDED IN STUDY

DEFINITION :

IGNITION PROPENSITY OF CIGARETTES IN TERMS OF

- PERCENTAGE OF EXISTING FURNITURE AND MATTRESSES WHICH IGNITES
- TIME TO IGNITION

517003700

NEW FURNITURE -- EFFICIENCY OF VARIOUS STANDARDS

- UFAC - "ENGINEERED TO REDUCE, BUT NOT NECESSARILY ELIMINATE, IGNITION BY BURNING CIGARETTES"; ONLY PARTIAL COMPLIANCE
- CALIFORNIA - TO ELIMINATE MOST IGNITION PRONE FURNITURE
- BIFMA - PROBABLY VERY LOW CHANCE OF CIGARETTE IGNITION
- MATTRESSES - FED. STANDARD ; CAN STILL IGNITE IF CIGARETTE IS INADVERTENTLY COVERED BY BLANKETS

OLD AND REUPHOLSTERED FURNITURE.

A LARGE PART OF IT IS PRONE TO CIGARETTE IGNITION
REPLACEMENT CYCLE : 15 TO 20 YEARS

512003701

CIGARETTE IGNITION RESISTANCE OF UPHOLSTERED FURNITURE

RANKING OF MATERIALS IN ORDER OF DECREASING CIGARETTE IGNITION RESISTANCE:*

	<u>FABRICS</u>	<u>FILLING</u>
BEST	WOOL, HEAVY VINYL, NYLON, OLEFIN, POLYESTER HEAVY	VONARR, HEAT DISSIPATING MATERIALS POLYESTER BATTING SR POLYURETHANE FOAM, SR COTTON BATTING UNTREATED POLYURETHANE FOAM UNTREATED COTTON BATTING
	LIGHT COTTON, RAYON LIGHT HEAVY	

OTHER FACTORS AFFECTING CIGARETTE IGNITION RESISTANCE : WELT CORD, FLAT VS.
: CREVICE AREA

* THERE IS CONSIDERABLE OVERLAP BETWEEN GROUPS OF MATERIALS.

517003702

CHARGE TO COMMITTEE

INVESTIGATE "SELF-EXTINGUISHING CIGARETTE CONCEPT"

THE EXPRESSION "SELF-EXTINGUISHING CIGARETTE" HAS BEEN USED BY MOST ADVOCATES AND OPPONENTS OF CIGARETTE SAFETY BILLS.

FOR MANY UPHOLSTERED AND MATTRESS SUBSTRATES, SELF-EXTINGUISHMENT IS NOT NECESSARY: CIGARETTES CAN BURN THEIR WHOLE LENGTH AND NOT IGNITE THE SUBSTRATES.

SUGGEST CHANGE TO "LOW IGNITION PROPENSITY CIGARETTE"

DEFINE LOW IGNITION PROPENSITY CIGARETTES AS THOSE WHICH :
IGNITE THE LOWEST POSSIBLE PERCENTAGE OF EXISTING SUBSTRATES,
AND, IF THEY IGNITE, HAVE THE LONGEST POSSIBLE IGNITION TIME.
(THE LONGER THE IGNITION TIME, THE LOWER THE PROBABILITY OF IGNITION).

NOT INSISTING ON SELF-EXTINGUISHMENT WOULD MAKE TECHNOLOGY LESS RESTRICTIVE,
AND MAKE IT EASIER TO MAINTAIN LOW TAR, NICOTINE, AND CO LEVELS.

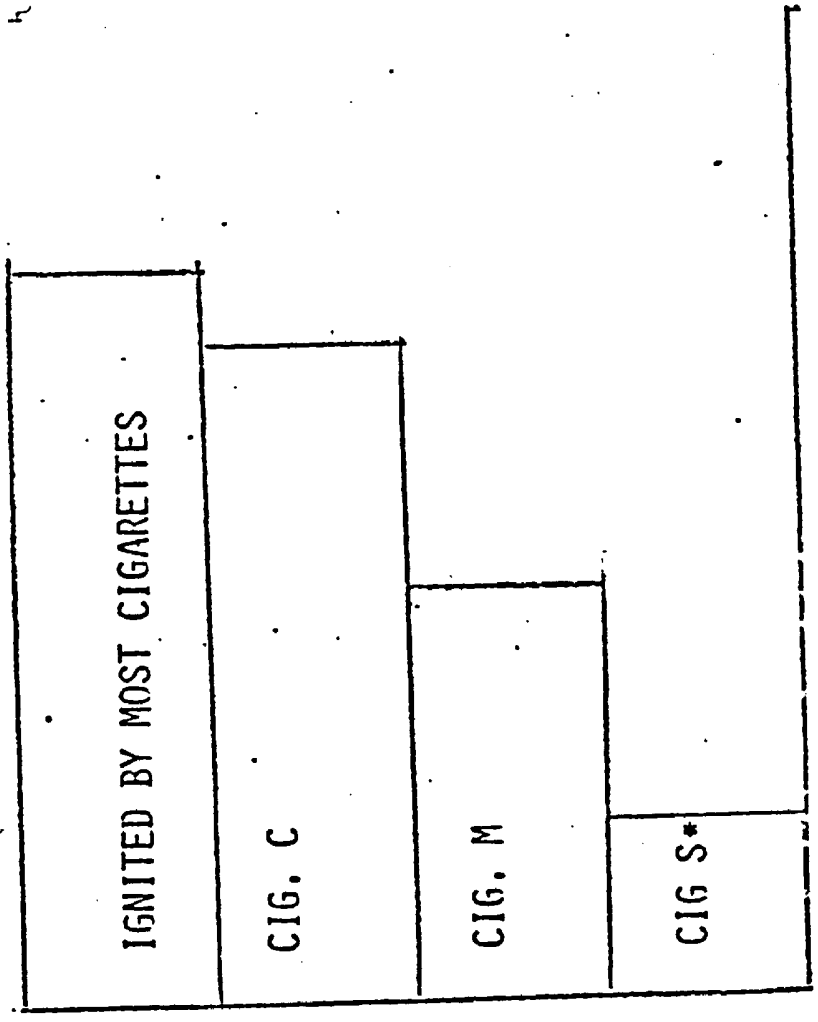
EXPERIMENTAL FINDINGS :

- OF ABOUT 35 COMMERCIAL CIGARETTES TESTED, MOST HAD SIMILAR IGNITION PROPENSITY IN TERMS OF SUBSTRATES IGNITED, AND IGNITION TIME.
- THREE COMMERCIAL BRANDS IGNITED FEWER SUBSTRATES, AND IGNITION TIME WAS SHORTER; EVEN WHEN IGNITION OCCURRED, SMOLDER SPREAD WAS SLOWER.
- ONLY ONE OF THESE BRANDS SOMETIMES SELF EXTINGUISHED.
- THESE BRANDS WERE NOT DESIGNED BY THEIR MANUFACTURERS TO HAVE LOWER IGNITION PROPENSITY.
- COULD LOW IGNITION PROPENSITY BE CONSIDERED IN CIGARETTE DESIGN ?

517003704

PROPORTION OF UPHOLSTERED FURNITURE AND MATTRESSES WHICH COULD BE
 IGNITED BY VARIOUS BRANDS OF CIGARETTES.

FTC PACK DENS. DIAM. ??
RATING



WHOLE RANGE

LOW LOW NORM.

MEDIUM NORM. SMALL

HIGH NORM. SMALL

TOTAL POPULATION OF UPHOLSTERED FURNITURE
 AND MATTRESSES

NOTE : LENGTH OF BARS BASED ON ROUGH ESTIMATE.

*SOMETIMES SELF-EXTINGUISHING

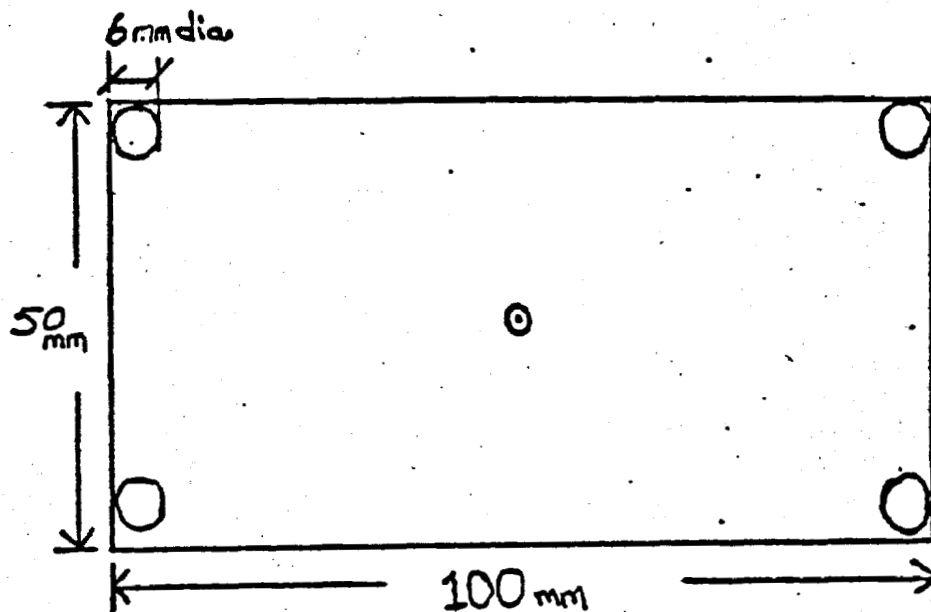
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TEST FOR THE IGNITION PROPENSITY OF CIGARETTES.

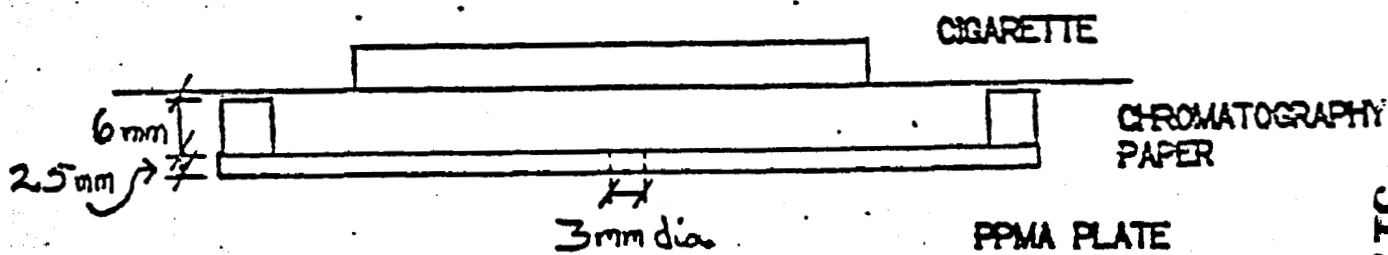
PLACE CIGARETTE ON ALPHA CELLULOSE PAPER

MEASURE WEIGHT LOSS RATE

WEIGHT LOSS RATE CORRELATES WITH FINDINGS ON SUBSTRATES



TOP VIEW



SIDE VIEW

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SCALE 1"=1"

TAR, NICOTINE AND CARBON MONOXIDE RATINGS OF CIGARETTES

- FTC RATINGS ARE AFFECTED BY :

 - TOBACCO COLUMN :

 - TOBACCO BLEND

 - AMOUNT OF TOBACCO : PACKING DENSITY, CIGARETTE LENGTH AND DIAMETER

 - PAPER :

 - POROSITY

 - BURN RATE RELATIVE TO TOBACCO COLUMN

 - VENTILATION - DILUTING SMOKE BY AIR ADMITTED THROUGH OPENING IN CIGARETTE PAPER AND/OR FILTER

- QUESTION OF PERTINENCE OF FTC RATINGS WITH RESPECT TO HUMAN HEALTH

 - SMOKING MACHINE DOES NOT SMOKE LIKE HUMANS

 - CHANGE OF SMOKING PATTERNS WITH LOW FTC RATED CIGARETTES:

 - SMOKING MORE CIGARETTES

 - DEEPER INHALATION

 - COVERING OF INHALATION HOLES

517003707

Statement of Philip S. Schaenman
President, TriData Corporation
November 16, 1983

Statistics on Smoking-related Fires

I would like to present a summary of the latest statistics on smoking-related fires and the implications of the data for the various approaches to reducing the problem. Also, I would like to discuss the sources and quality of the data being used. Just last week, TriData completed the first detailed analysis of the newly available 1982 NFIRS data so that this committee could have the best information to work with. It shows a change in the situation, and I will present the details later on.

First, let us be clear that the problem is real. While the precise number of smoking-related fires is not known and probably cannot be known, smoking-related fires are the leading cause of fire deaths in the United States and this has been the case for years. Careless smoking also appears to be the leading cause of fire deaths in the majority of individual states. (The big exception is the southeastern states where heating is the number one cause.)

Careless smoking is among the leading causes of fire deaths in every nation in the Western world for which we have data, though not necessarily the number one cause. It is also one of the significant causes of fires and injuries from fires in other countries, just as it is in the United States.

Let us look at the specific data, starting with the national estimates of the big picture so that we can put the smoking-related fire data in proper perspective.

The estimated numbers of fires and fire deaths in the United States in 1981 and 1982 were as follows:

Table 1.
U.S. Fires and Fire Deaths

	<u>Total Fires</u>	<u>Residential Fires</u>	<u>Total Fire Deaths</u>	<u>Residential Fire Deaths</u>
<u>1981</u>				
USFA estimate	2,828,000	714,000	7,600	6,100
NFPA estimate	2,894,000	733,000	6,700	5,500
<u>1982</u>				
USFA estimate	NA	NA	(6,800) ¹	(5,600) ²
NFPA estimate	2,438,000	677,000	6,000	4,900

Change from 1981 to 1982 (NFPA only)	-356,000 -12%	-56,000 -8%	-700 -10%	-600 -11%
=====				

1 USFA has not made 1982 estimates; this TriData estimate assumes that the USFA-to-NFPA ratio of 1981 would have been the same in 1982.

2 TriData estimate based on residential being 80% of the total fire deaths.

The "fires" shown in Table 1 are fires reported to the fire service. This is important to keep in mind when we discuss the sharp drop in reported smoking-related fires. Note also that 80% of all fire deaths occur in residences. Even a greater percentage (95%) of smoking-related fire deaths occurs in residences, so we will concentrate on the residential data.¹

Despite the 10% drop in fire deaths and the drop in fires, the United States probably continues to be first or second in fire deaths per capita in the world. We had more than double the average death rate for countries

¹ NFIRS 1982: only 18 out of 379 deaths with smoking materials (i.e., cigarettes, cigars, pipes) as the ignition source were not in residences.

in the Western world throughout the last decade, as Figure 1 shows. And we had one of the highest number of structural fires per capita among any nation, as shown in Figure 1. More recent data on other countries has not been published; however, the situation is likely to be similar, since the gap was so large.

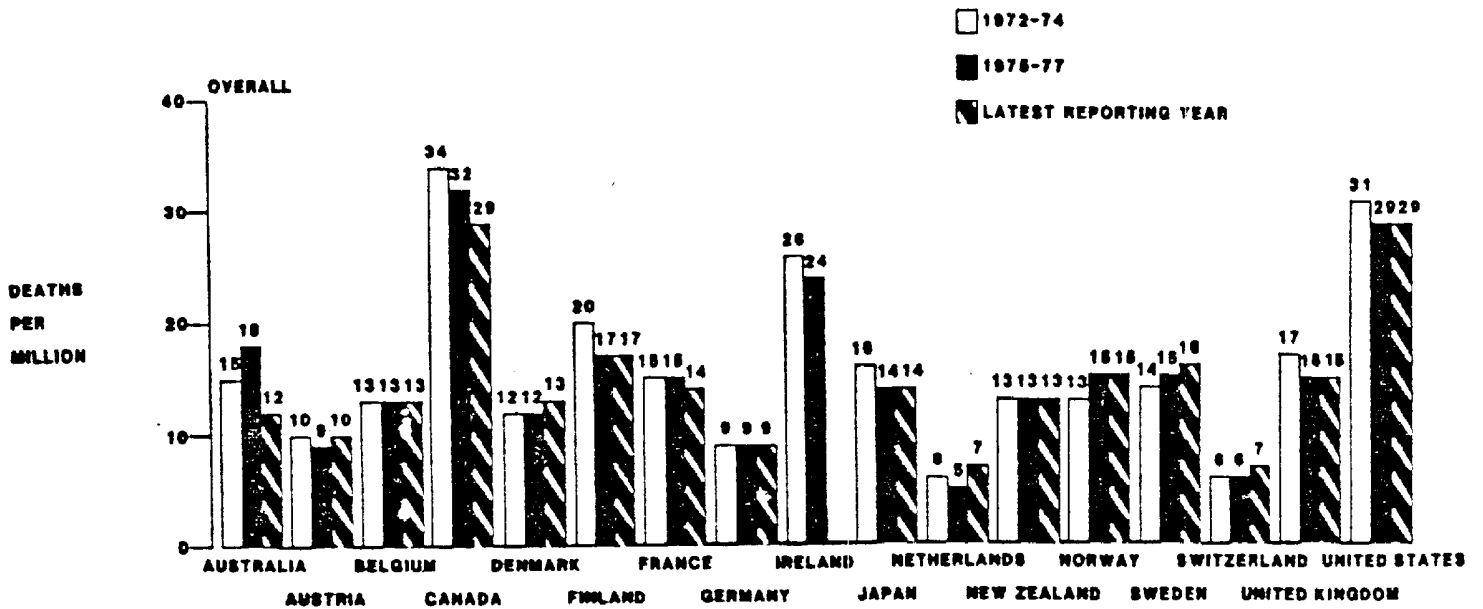
In December 1982, I published a report on International Concepts in Fire Protection, with which some of you are familiar. This report discussed the approaches European countries have used to reduce their fire problem, such as more attention to public education on fire safety, holding the careless consumer responsible for his/her actions through court fines and insurance penalties, etc. Smoking is the leading cause of fire deaths in England, and one of the highest in other countries, according to the fire services with whom I visited. (Data by cause are not available for most countries in a readily comparable form.)

However, while there has not been a definitive study to statistically demonstrate why their death rate is so much lower than ours, we can eliminate some reasons. There is only a weak and not statistically significant correlation of their cigarette consumption per capita to their fire death rate per capita.¹ In England, the cigarette consumption per capita is 84% of ours, yet the fire death rate is only 54% of ours. In the U.S., there also is no correlation between cigarette consumption and smoking-related fire deaths, as we shall see later. The Europeans use U.S. tobaccos in making most of their cigarettes; the little testing done has not found their cigarettes to be safer -- and they smoke many U.S.-made cigarettes. In France, where the government has a monopoly on cigarette production, as in other European countries, they are doing no research on fire-safe cigarettes, having achieved their desired safety goals through other means -- especially by focusing on consumer carelessness. We do not, of course, have to follow their pattern, but they do provide a multitude of examples where other approaches have worked.

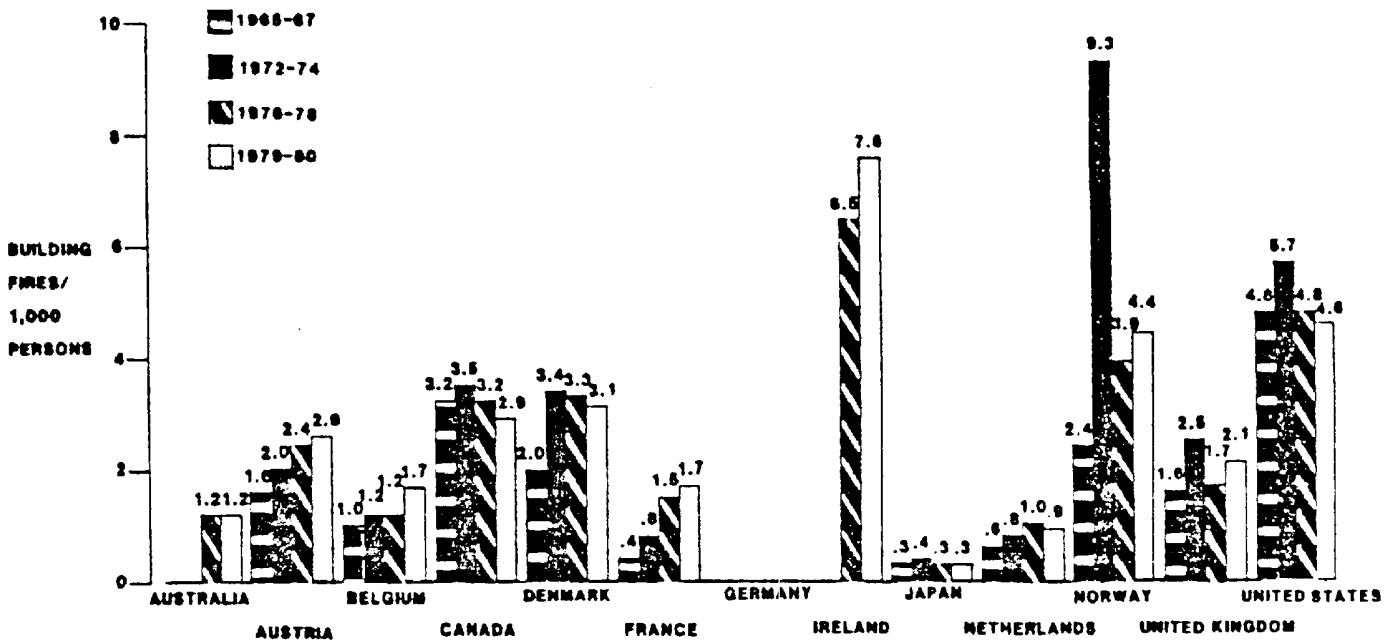
¹ Schaenman letter to Congressman John Moakley, July 25, 1983.

Figure 1. International Fire Statistics

COMPARISON OF FIRE DEATH RATES



COMPARISON OF BUILDING FIRE INCIDENCE



Source: Selected International Comparisons of Fire Loss 1979-1980, Jerry Banks, Georgia Institute of Technology, Atlanta, Georgia, September 1982.

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Smoking Totals

Let us turn now to smoking-related fire statistics in the United States. "Smoking-related" is defined following the U.S. Fire Administration definition. It includes fires involving cigarettes, cigars or pipes that were not incendiary or suspicious (i.e., over 98% of all fires in NFIRS in which cigarettes, etc., were the ignition source). The definition does not include fires started by matches or lighters. Over 95% of the smoking-related fires have cigarettes rather than cigars or pipes as the ignition source, so we will not break them out separately (though the data are available to do so should it be so desired).

Table 2 shows the smoking fire death data for 1981 and 1982. Two different estimates for the total deaths are presented, one based on USFA estimates and the other on NFPA estimates. All of the estimates use NFIRS data to apportion the total number of residential deaths to smoking.

The proportion of residential fire-related deaths attributable to smoking went down to 31.5% from 35%. It is still the leading cause, but the reductions are encouraging.

There has been a sharp drop in residential smoking-related fire deaths from 1981 to 1982, by 18-20%, or about 400 deaths. (Earlier we saw that overall residential fire deaths dropped by 11%, so smoking-related deaths went down even more sharply.) Thus, the absolute magnitude of the problem is dropping sharply.

About three-quarters (73%) of residential smoking-related fire deaths occur in one- and two-family residences, about the same proportion as the proportion of the population living in them.

Table 3 shows the data on smoking-related residential fires for 1981 and 1982. Similar to deaths, the number and percentage of smoking-related fires are sharply down by about the same percentage as deaths.

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**Table 2.
Smoking-related Fire Deaths**

<u>Class</u>	<u>1981</u>		<u>1982</u>		<u>Change</u>
	<u>Number of Deaths</u>	<u>% Class</u>	<u>Number of Deaths</u>	<u>% Class</u>	
<u>All Occupancies</u>				18.3	
<u>Residences</u>					
NFPA	1,939	} 35%	1,555 ¹	} 31.5%	-384 (-20%)
USFA	2,144		1,764 ²		-380 (-18%)
		<u>% Res. Smoking Deaths</u>		<u>% Res. Smoking Deaths</u>	
1-2 family	1,385	} 73%		} 73%	
Mobile Home	171				
Apartment	418	19%		25%	
Hotel	110	5%		1%	
Other	<u>60</u>	<u>3%</u>		<u>1%</u>	
	2,144	100%		100%	

1 Based on TriData analysis of the 1982 NFIRS data and the NFPA 1982 fire death estimate.

2 Based on TriData analysis of the 1982 NFIRS data and an assumption that the USFA-type of death estimate would be proportionally higher than NFPA's in 1982 as it was in 1981.

**Table 3.
Smoking-related Residential Fires**

	<u>1981</u>		<u>1982</u>		<u>Change</u>
	<u>Number Fires</u>	<u>% Res. Fires</u>	<u>Number Fires</u>	<u>% Res. Fires</u>	
Residential	65,000	9.1	51,300	7.6 ¹	-13,700 -21%

1 Percentage developed by TriData analysis of NFIRS 1982 tapes, then multiplied by estimates of total residential fires from the NFPA 1982 survey to obtain the estimate of smoking-related fires.

Long-Term Trends

Figure 2 shows the trends in total fire deaths and smoking-related fire deaths over the past six years. Fire deaths have trended downward from 1977 to 1981, and continued to do so in 1982. The estimates of smoking-related fire deaths have larger variance than the total because of their small proportion of the total, and it was hard to discern a trend until the 1982 data became available -- and the trend is downward.

Figure 3 shows the trends in the causes of fires in one- and two--family dwellings. The chart for 1977-1981 is from the USFA; TriData computed the 1982 figure for smoking. (Data on the other causes is available but was not computed simply because of lack of time.)

Smoking-related fires have decreased each year now for six years, with 1982 being the largest percentage drop. The trend is smoother partly because of the much larger number of fires than deaths, and possibly because the number of "unknowns" is smaller for fires than for deaths.

Smoking is the fifth cause in frequency of fires, though first in fire deaths (and injuries).

Smoke Detectors

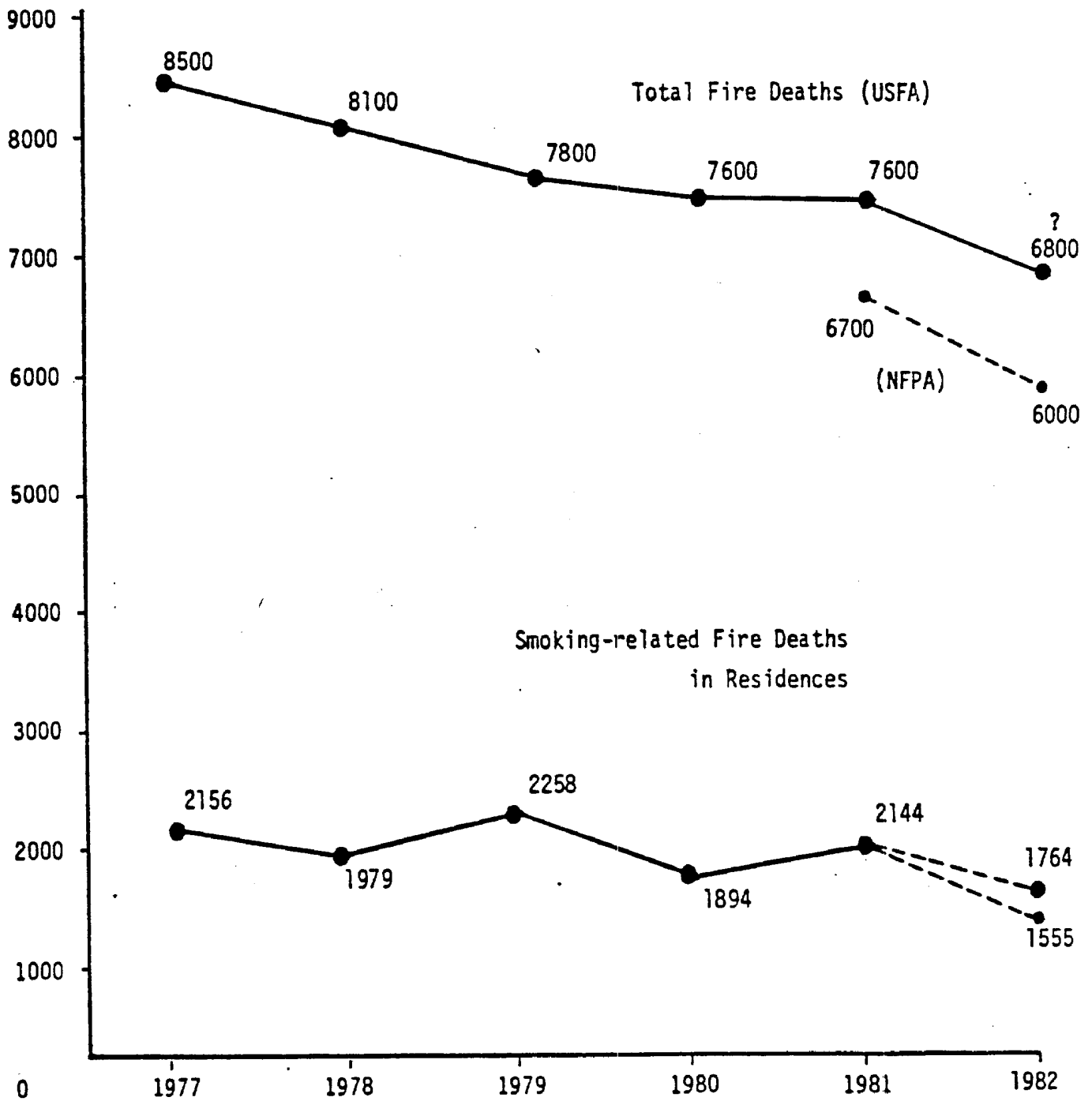
What are the reasons for the decreases shown in Figures 3 and 4, and especially the sharp drop in 1982?

One major contributing factor most likely is smoke detectors, which increased in coverage from less than 5% of households in 1975 to 20% in 1977, to 50% in 1980, to 67% in 1982 (based on USFA-sponsored national surveys). Of particular significance may be that at least one-third of the poor and elderly had detectors in 1982, and they have been the disproportionate victims of fires, especially smoking-related fires.

Table 4 shows the latest findings on the presence of smoke detectors in smoking-related fire deaths.

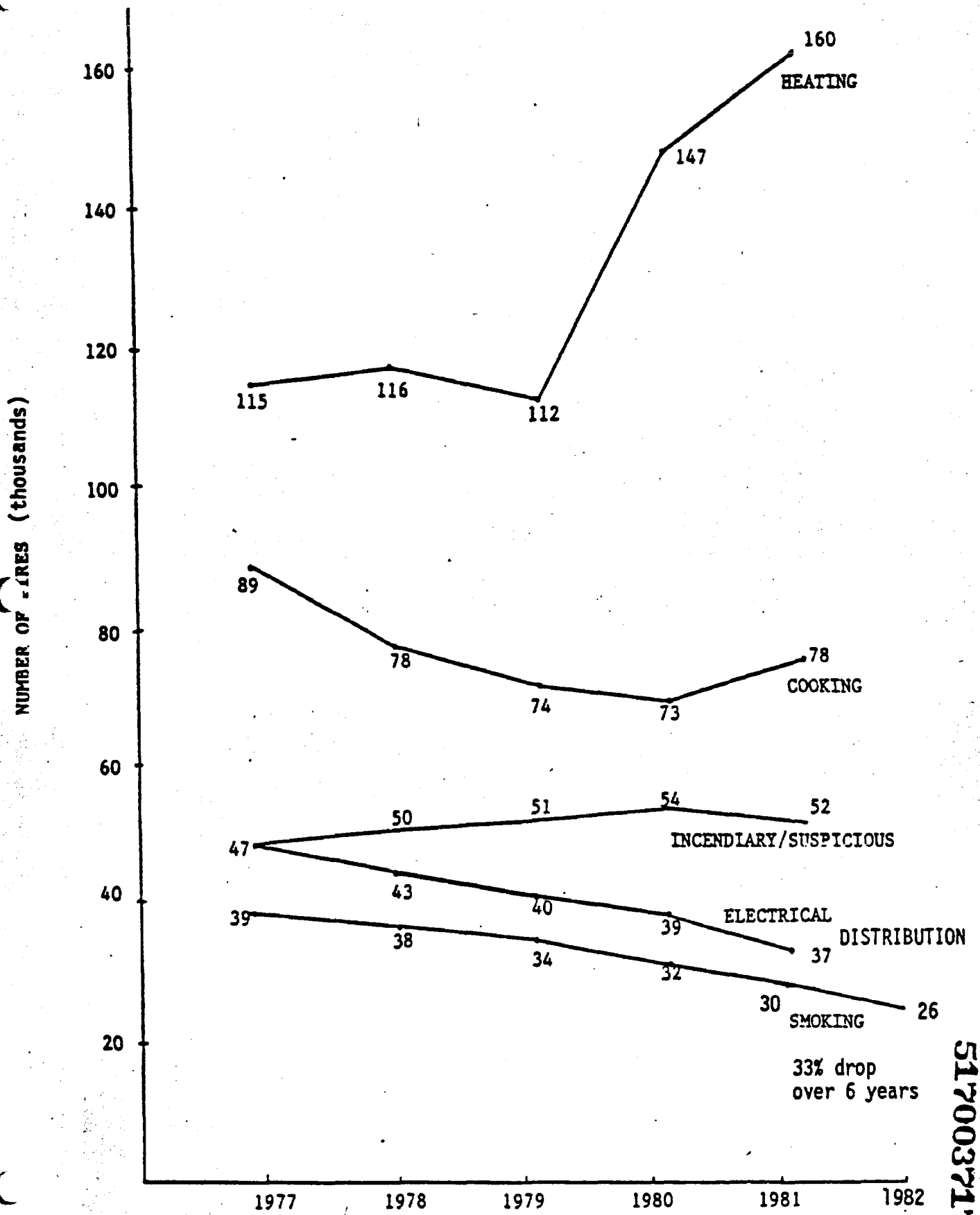
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Figure 2. Fire Deaths



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Figure 3. Trends in Selected Causes of Fires in One- and Two-Family Dwellings



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Table 4.
Detectors in Smoking-related Residential Fire Deaths
 (1982 NFIRS)

	<u>Deaths</u>	<u>%</u>
No detector	194	83
Detector present but did not work	12	5
Detector worked	<u>28</u>	<u>12</u>
	234	100

Of the 234 smoking-related deaths (about two-thirds of all smoking-related deaths) for which the fire service reported on the presence and operation of detectors in NFIRS in 1982, 83% had no detectors and another 5% no working detector. That is, 88% of the deaths occurred where detectors were not available to help, even though 67% of households now have detectors.

Thus, we see that fire deaths have decreased as detectors spread, and that the fire deaths that still occur almost always do not have a working detector present. This strongly suggests that we have not "bottomed out" on the effectiveness of detectors for smoking-related fire deaths, despite the fact that they often involve people who are intoxicated. The further spread of detectors should make further in-roads into smoking-related fire deaths.

Frequency of Deaths per Fire vs. Smoke Detectors

Most smoking-related fire deaths occur one per fire. Table 5 shows the number of deaths in multiples.

Thus, in 97.7% of smoking-related fires reported to the fire service, there are no deaths. The death scenario circumstances are relatively rare. Of the 2.3% of reported smoking-related fires where a death occurs, 88.5% involve one death. The number of "third parties" who die beyond the smoker cannot be determined from existing data. (Though some people are quoting such numbers, they do not exist nationally.) We can see that the

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Table 5.
Number of Deaths per Smoking-related Residential Fire
(1982 NFIRS)

<u>Number of Deaths/Fire</u>	<u>Number of Fires</u>	<u>Number of Deaths</u>
0	12,750	0
1	269	269
2	23	46
3	7	21
4	3	12
5	1	5
6	1	6
7 or more	<u>0</u>	<u>0</u>
	13,054	359

minimum number of third parties is 55 of the 359 deaths, or 15%, not the 40% sometimes quoted. However, that is the minimum, since some of the victims in some of the one-death fires may be someone other than the smoker.

Information on detectors was reported for 20 of the 35 multiple death smoking-related fires in the 1982 NFIRS. Only one out of twenty was reported to have had a detector present and operating; the other 95% had no detector. That is remarkably low considering the percent of households with detectors in 1982. It also suggests that having detectors present may eliminate much of the risk to "third parties."

Upholstered Furniture

The classic fire scenario involving smoking is a cigarette being dropped on upholstered furniture or bedding. Table 6 shows the proportions for fires and deaths.

Upholstered furniture was ignited first in connection with about two-thirds of smoking-related fire deaths for which the form of material first ignited was specified. By contrast, bedding and mattresses account for more than half of all smoking-related fires. Upholstered furniture,

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mattresses, and bedding -- considered together -- account for 83% of the smoking-related fire deaths, with the largest part of the remainder of the deaths having an unknown form of material ignited. In all smoking-related fires where the form of material first ignited is identified, it is either upholstered furniture, bedding or mattresses, as shown in Table 6.

Table 6.
Upholstered Furniture and Bedding/Mattresses
in Smoking-related Residential Fires
(1982 NFIRS)

<u>Form of Material First Ignited</u>	<u>Fires</u>	<u>%</u>	<u>Fire Deaths</u>	<u>%</u>
Upholstered Furniture	3,711	45	195	66
Bedding and Mattresses	<u>4,560</u>	55	<u>99</u>	34
	8,271		294	

Thus, fire-resistant upholstered furniture and bedding/mattresses should be considered in selecting approaches to solve the smoking fire problem. Improvements in these products may have already contributed to the progress made to date.

Age

Table 7 shows the distribution of the 1982 NFIRS smoking-related fire death victims by age:

Table 7.
Age Distribution of Smoking-related Fire Deaths
(1982 NFIRS)

<u>Age Group</u>	<u>Number</u>	<u>%</u>
4 and under	14	4
5-19	22	6
20-34	44	13
35-49	30	9
50-65	70	20
66-80	52	15
81-95	24	7
Not given	<u>95</u>	<u>27</u>
	351	100

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Thus, 90% were adults. Few were very old or very young, and this was supported by data in Table 9, "Condition Before Injury -- Smoking-related Fire Deaths" (page 14), where only 2% were listed as too young or too old to act. (In statements by others, the proportions of very young and very old victims have been said to be much higher than these results support.)

Nature of Injury

The vast majority of the fire death victims were reported by the fire service as having injuries from smoke alone or a combination of smoke and burns. (Of course, autopsy data would be better.) Only a small fraction were reported as having burns alone. This data from firefighters is generally consistent with the more detailed Berl-Halpin Johns Hopkins University study¹ in which the preponderance of Maryland fire death victims in 1972-1977 were found to have died from the toxic gases (especially CO) in the smoke.

Table 8.
Nature of Injury -- Smoking-related Fire Deaths
(1982 NFIRS)

	<u>Number</u>	<u>%</u>
Burns	11	3
Burns and smoke	170	48
Smoke alone	70	20
Other	10	3
Unknown	<u>90</u>	<u>26</u>
	351	100

¹ Human Fatalities from Unwanted Fires, Walter J. Berl and Byron M. Halpin, April 1979.

Condition Before Injury and Public Education

Table 9 shows that the largest category of "condition before injury" was asleep. Some of these people may well have been intoxicated. Very few are listed as awake and unimpaired.

Table 9.
Condition Before Injury -- Smoking-related Fire Deaths
(1982 NFIRS)

<u>Condition</u>	<u>Number</u>	<u>%</u>
Alcohol- or drug-impaired	42	12
Bedridden or other physical handicap	21	6
Asleep	129	37
Too young to act	5	1
Too old to act	4	1
Awake, unimpaired	18	5
Other	3	1
Unknown	<u>131</u>	<u>37</u>
	351	100

The Johns Hopkins study found that over half of the adult victims were alcohol-impaired. Some believe that this means that prevention education cannot reduce the number of victims.

However, many are not alcohol-impaired and not handicapped. Further, it is not clear that public education could not have an effect even on those intoxicated. The Germans, for one, believe that public education messages can influence fire safety behavior even of those intoxicated (not for receiving a new message, but for remembering well-implemented ones).

I do not know of any research specifically addressing the effectiveness of public education on smoking-related fires, and people certainly are aware that a burning cigarette should be handled with care. But there is extensive evidence that good public education fire safety programs can work.

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Deaths vs. Cigarette Consumption

There is no apparent correlation between smoking-related fire deaths and cigarette consumption in the U.S., as seen from Figure 4. For example, the year with the largest rise in consumption (1980) was also the year with the second largest drop in the death estimate. Also, the year to year changes in consumption are much smaller percentage-wise than the year-to-year changes in the death estimates. Though the death estimates variance is high and could conceivably mask some slight correlation, there is no valid reason to believe it exists.

Over 600 billion cigarettes are smoked annually in the U.S., of which nine millionths of a percent (51,000) result in fires reported to the fire service, and three-tenths of a millionth of a percent result in a death. If we assume smokers smoked over a pack a day, the odds would be little more than one fire per million smokers. Also, the subpopulation most susceptible to having an accidental fire may be (and probably is) very different from the general population of smokers.

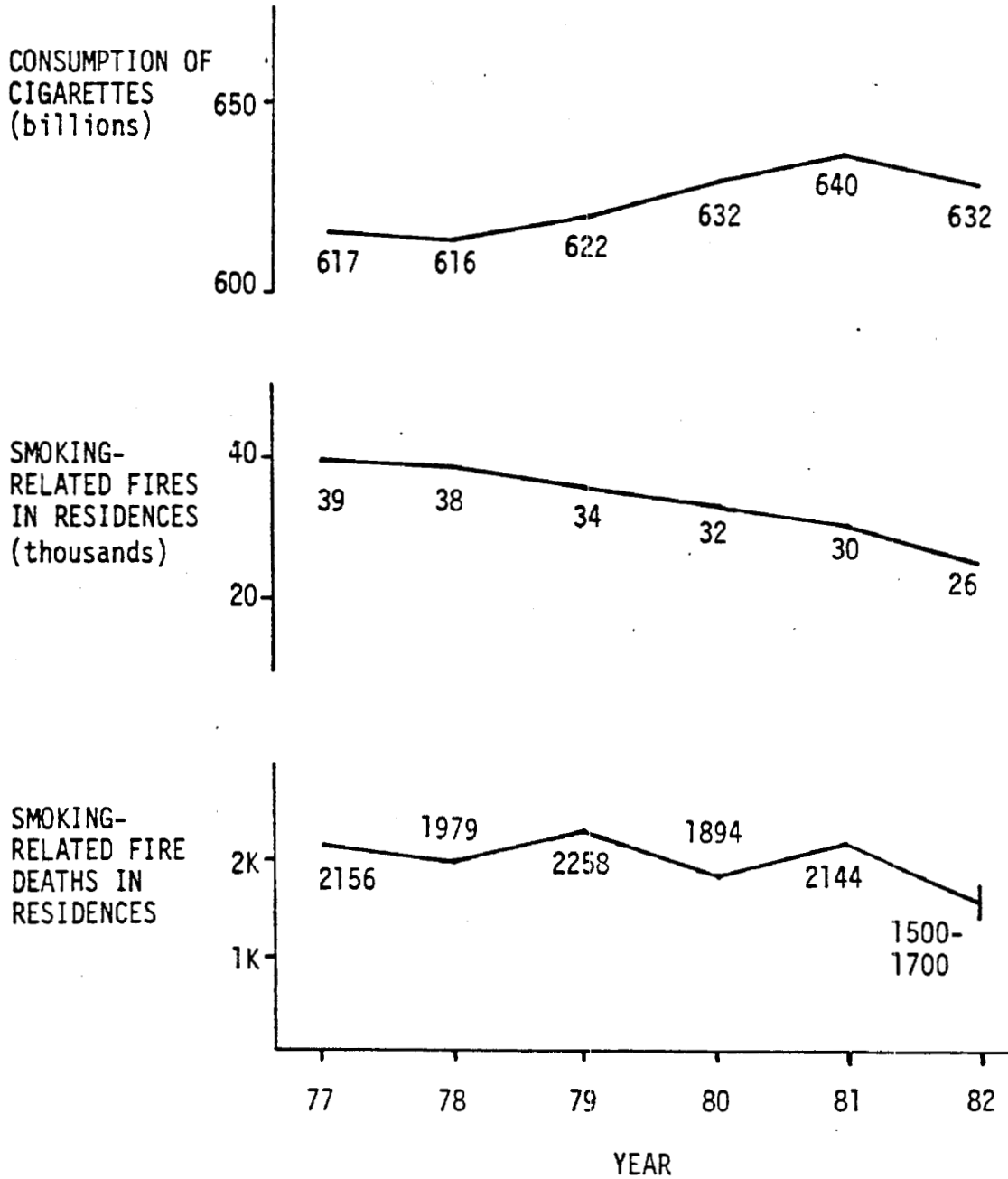
Methodology for Death Estimates

National statistics on smoking-related fire deaths have been available in a consistent manner for only six years, since the National Fire Incident Reporting System started.

The NFIRS has grown each year, as more states and fire departments join the system. The 1982 NFIRS data is the most comprehensive "sample" to date, with 180,000 residential fires out of the total 667,000 residential fires estimated by NFPA, and 2,072 out of 6,000-6,800 deaths. In other words, between 1 in 3 and 1 in 4 fires and fire deaths are in the data base. In previous years, it was close to 1 in 5.

Nevertheless, the statistics on smoking-related fire deaths are all based on the 379 fire deaths in the NFIRS data base that are attributed to smoking. The assumption is made by most analysts that the fires of "unknown" reported cause are distributed like the knowns. Unknowns comprise about a quarter of the fire deaths in NFIRS. So the 379 is scaled upward by a factor of 4/3.

Figure 4. Cigarette Consumption and Smoking-related Fires and Deaths



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Then the data is scaled up to national estimates using the ratio of the total fire deaths estimated by the U.S. Fire Administration or NFPA to the number in NFIRS, another factor of 4 or 5. The USFA estimates and NFPA estimates have differed sharply over the years, and the shape of the fire death trend curves have not been the same. The USFA in 1981 estimated 900 more deaths than did NFPA. The NFPA estimate is based on a statistical analysis of a non-random sample of 2,000-3,000 fire departments that elect to respond to their survey. The USFA estimate is based on death certificate information from the National Center for Health Statistics, with adjustments for certain types of fire deaths missed.

No one knows the precise number of fire deaths, let alone smoking-related deaths. But the trends are beginning to emerge and the dimensions of the problem are taking enough shape to give us our best ever look at the problem.

Summary

There are many loose ends in our statistical view of fires, including those fires caused by careless smoking. We are sure the smoking-related problem is significant, but it is declining markedly. There are many links in the chain of events leading to a smoking-related fire that can be attacked. I subscribe to the philosophy that was articulated by the past directors of the Center for Fire Research at the National Bureau of Standards, which was that no one element of a prevention program is likely to be perfectly implementable or to work perfectly, and that several lines of defense are needed (Lyons and Clarke). The cigarette itself certainly should be examined, but there are a number of other ways to attack the problem if a satisfactory change in the product is not possible.

Smoke detectors seem to have played a significant role in the downward trend of smoking-related fire deaths. The spread of detectors should be further encouraged and smoke detector maintenance emphasized. The influence of drinking on fire victims has clouded the picture as to the potential for public education, but many victims are not impaired and some people believe public education may even help reduce the alcohol-related

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deaths. Upholstered furniture and bedding are overwhelmingly the things that smolder or catch fire first and should continue to be the focus of research and what has already been learned should be applied in the manufacture of these products to increase fire resistancy -- especially upholstered furniture.

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7

CITIZENS COMMITTEE FOR FIRE PROTECTION

A Non-profit Corporation Working in the Public Interest

Statement Before the IAFC
Ad Hoc Committee on Fire Safe Cigarettes,
November 16, 1983

I appreciate the opportunity to appear before this Committee. The Citizens Committee for Fire Protection is an independent, non-profit organization dedicated to reducing the toll of death and destruction caused by fire. Our own inquiries lead us to conclude that the tobacco industry can make safer cigarettes, and that such cigarettes will go a long way toward lowering this Nation's excessive fire death rate. In fact, it is the single fastest and most effective action now available to us to lower fire deaths.

Cigarette Technology and the "Self-Extinguishing Cigarette"

I would like to start by urging that this Committee broaden its line of inquiry in one critical way. The questions you have posed all refer to "self-extinguishing" cigarettes. This is too narrow a focus, and excludes a very promising approach. The National Bureau of Standards laboratory tests found that some commercial cigarette brands, although they burned completely, did not ignite the underlying upholstery fabrics.¹ These cigarettes are not "self-extinguishing," but their universal use would prevent many fires.

In line with this research finding, none of the currently-pending federal or state bills that we know about is limited to

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self-extinguishing cigarettes. They all provide that cigarettes would have to either self-extinguish or burn all the way down without igniting an underlying fabric.

Accordingly, we ask that you also consider the issue in these broader terms, and be sure to discuss each approach separately in your final report.

I would also like to point out to you that the tobacco industry has concentrated in its public statements on criticizing only self-extinguishing cigarettes.² By-and-large, they have ignored the other approach. Many of the arguments and concerns they raise about self-extinguishing cigarettes do not apply to the other approach.

Fire-Safe Cigarettes Need Not Result in Increased Health Risks.

The cigarettes that burn completely without causing upholstery fires may actually lower the smoker's tar and nicotine exposure. The National Bureau of Standards' researchers were uncertain why these cigarettes did not cause fires. However, they suggest that two factors were lower packing density of tobacco (which causes the cigarette to burn cooler) and narrower diameter (which results in less contact between the cigarette and the fabric, and therefore less efficient heat transfer). Both of these design features produce lower tar and nicotine levels. In fact, one of the cigarettes successfully tested by the NBS was Carlton, supposedly the lowest tar and nicotine cigarette on the market.

I also call your attention here to the growing body of medical research that questions whether low tar and nicotine cigarettes

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really produce any significant health benefit.³ This research apparently shows that smokers of low tar and nicotine cigarettes are taking the same amounts of nicotine into their blood stream as they would if they smoked high tar and nicotine cigarettes.

I am not qualified to discuss or evaluate this research. I have suggested before that this committee hear directly from the authors of these studies, and I reiterate that suggestion now. If their work withstands scrutiny, it suggests that we have far more leeway in changing the cigarette than we may have thought previously.

In an appendix to this testimony, I have covered the other technical questions about which the Committee asked, questions such as the feasibility of alternative solutions to the cigarette fire problem, and whether fire-safe cigarettes will require greater use of matches and lighters. However, I would like to turn now directly to the last question on your issue paper, "What should the IAFC position be?" Since I am apparently the only lawyer in the group, I believe it would be helpful if I could review with you the provisions of the various bills pending before Congress, compare them with one another, and describe the areas we think you should look for as Congress considers and modifies these bills.

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Review and Comparison of Pending Federal Legislation

Two major pieces of safe-cigarette legislation are currently pending in Congress. The first is HR 1880, introduced in the House by Congressman Moakley of Massachusetts. It would give the CPSC two years to develop a standard for fire-safe cigarettes, and authority to implement that standard if it is feasible and can be done without imposing unacceptable health and economic burdens. S. 1935, introduced by Senator Heinz of Pennsylvania, provides simply for a two-year study, to include development of a standard and consideration of health and economic consequences.

There are five areas that we think are important in considering whether these bills, and various proposals floated by the tobacco industry, will be useful and effective: Pre-emption of state efforts; the composition of the study committee; the mandate given to the study group or agency; its authority to compel production of important information from the cigarette companies; and the extent to which such information will be regarded as secret.

Pre-emption: The first issue is whether federal research and regulatory efforts will displace or pre-empt state efforts to require fire-safe cigarettes. There are many areas in the law where, once the federal government acts, or decides that no action is appropriate, the states are prohibited from imposing their own standards. Those of you who are dealing with shipment of hazardous materials through your jurisdictions are no doubt already familiar with this concept.

The Heinz bill, which provides only for a study of the feasibility of fire-safe cigarettes, contains no pre-emption clause.

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States would be free to continue their regulatory work during the federal study.

The Moakley bill places the project in the hands of the Consumer Product Safety Commission. There is no pre-emption of state efforts during the two-year effort to prepare a rule. Under the Commission's current operating statute, though, once the rule is in place state standards are pre-empted unless the CPSC rules otherwise.

We certainly do not favor any pre-emption of state efforts until a federal standard is in place. We believe one of the great strengths of the American system is that we have, in the 50 states, 50 different laboratories to try out various approaches to new and difficult social problems. Those of you who are local officials are well aware that the federal government has no monopoly on wisdom.

In any event, we also believe that the current activity on fire-safe cigarettes at the state level is a major force motivating the federal action. We would like to see this continue. From this perspective, either the Heinz or the Moakley bill is acceptable.

One of the most unfortunate combinations would be a permanent pre-emption of state efforts with no guarantee of a federal standard. There is talk among some tobacco people of a bill to establish a two-year federal study, accompanied by a pre-emption of state efforts that would last forever. We trust the IAFC would join us in condemning any such bill.

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Composition: A second issue is the composition of the study group. The Moakley bill places the entire project within the CPSC, although it's strongly implied that they are to work closely with the National Bureau of Standards in setting the basic standard and with the National Institute of Health in considering the potential health effects.

The Heinz bill establishes a Task Force composed of six federal officials and one tobacco industry representative. The federal officials would come from the National Institute of Health, the Department of Health and Human Services, the Surgeon General's Office, the CPSC, the Federal Trade Commission and the NBS. Under the Task Force would be a 15-member Technical Advisory Group. Four members would come from the tobacco industry and one from the American Burn Association. The other 10 members are not specified.

Either of these seems acceptable, although we would like to see greater consumer input on the Heinz bill's Technical Advisory Group, and you would no doubt like to see greater fire-service representation.

We have to watch very carefully the composition of these study groups. We can expect that any tobacco industry representatives will vote as a group. It would be very unfortunate if the study group were dominated by tobacco representatives and a few of their hand-picked friends from the fire service. Such a study group would be suspect from the very beginning, and in two years we would be right back where we started from.

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Mandate: A third important issue is the mandate given to the study group or agency. Here, the Moakley bill is clearly superior. It directs the CPSC to research and establish a standard, if that can be done in two years and without producing unacceptable health and economic consequences. The Heinz bill provides for a simple study; what is to be done with the results, we won't know for several years.

We favor the Moakley bill here for obvious reasons. It is very difficult to gather together all the forces to take on a powerful lobby like the cigarette industry. Under the Heinz bill, we have to gather them once this year to authorize a study; again two years from now to authorize CPSC or some other agency to act on the study's results; and possibly a third time to pass on the standard the agency devises.

The Moakley bill would take care of all those steps at once, but give the CPSC clear guidelines about whether it should impose a standard. For the fire service, which does not have a history of strong lobbying, the Moakley bill seems preferable.

Authority to obtain information: Another important area is the authority of the study group or agency to require that the tobacco industry give it the information it needs. The Moakley bill places the study in the hands of the CPSC, which already has subpoena power to obtain information it needs.

The Task Force established by the Heinz bill has no such power. It can insist on information from other federal agencies, but it has no specified power to compel the tobacco companies to deliver important information.

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Again, we favor the Moakley bill. The tobacco industry is obviously resisting this effort at regulation, and in the crunch, they are not likely to give up crucial information voluntarily. They could easily claim that the needed information is some sort of trade secret that they do not wish to reveal in front of their competitors. There is no judge or impartial arbiter to review such claims, so the tobacco industry can make them indiscriminately and no one would ever be the wiser.

This is already a problem. We've heard tobacco industry representatives say on several occasions before legislative committees that they've spent vast sums of money researching fire-safe cigarettes, and have yet to discover how to make one. Legislators have asked for copies of these studies, but none are ever forthcoming. In fact, so far as we know, Dr. Spears' paper is the only research work on fire-safe cigarettes that the cigarettes industry has ever published. We often wonder if it's the only such research they've ever done.

The investigating agency here must be given the power to require the production of essential information from the tobacco industry. Only then can it get the information it needs from all parties, and have the full benefit of tobacco industry research, if such research has been done.

Trade secrets: The final area to consider is that of trade secrets. The two bills are largely similar in this respect. Under the Heinz bill, the Task Force determines which information is to be considered secret. That information is then exempt from required

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public release under the Freedom of Information Act, and unauthorized release could result in criminal penalties. But the Task Force may use the information in its final report to Congress.

CPSC generally has the same power already. If anything, its statute is slightly more restrictive, since it also must make findings about accuracy and fairness before it can release any product-specific information.

We suggest you be very careful here of bills that are too sweeping in their trade secret provisions. Be especially careful of any bill that would grant trade secret status, across the board, to any and all information the tobacco industry may submit. A provision like that would make the entire basis for the study into a secret affair. No one would be able to analyze or criticize the results of the study, because no one would know what it was based on. The study would be worthless as a scientific and policy-making document, and we would all be back where we started.

For all of these reasons, we favor the Moakley bill, I think if you will take a close look at it, you'll see that it already takes into account the concerns you've expressed, and represents a well-tempered compromise. CPSC would have a reasonable but limited time to look into this matter, and cannot go ahead unless the standard is feasible and the economic and health consequences are acceptable. But if these conditions are met, the Moakley bill allows the Commission to proceed without further delay. And that is as it should be in addressing this very worst aspect of America's fire problem.

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CITIZENS COMMITTEE FOR FIRE PROTECTION

A Non-profit Corporation Working in the Public Interest

Appendix to

Statement Before the IAFC

Ad Hoc Committee on Fire-Safe Cigarettes,

November 16, 1983

Answers to Questions 1, 2, 8 & 9

Safer Cigarettes Will Not Cause an Increased Fire Problem from Use of Matches and Lighters. The IAFC summary of issues raises concern that self-extinguishing cigarettes may result in more frequent use of matches and lighters, and therefore some increase in fire hazard. For several reasons, we do not think there will be such an increase in hazard.

To begin with, there is the very promising category of cigarettes that burn completely without igniting upholstery fabrics. Because these cigarettes do not self-extinguish, there is no reason to think they will result in more frequent use of matches and lighters.

Second, even self-extinguishing cigarettes are not likely to result in particularly greater use of matches and lighters. People will not relight these cigarettes. The tobacco industry has frequently pointed out that relighted cigarettes taste bad, and that people will not want to continue smoking one once it has gone out.

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Third, even if changes in cigarette design do result in more frequent use of matches and lighters, the overall result should be a major decrease in fire fatalities. The match-caused fires simply will not be fatal as often as the cigarette-caused fires.

Cigarette fires often occur in circumstances especially dangerous to life. U.S. Fire Administration statistics for 1981 show that while cigarettes caused 8.9% of all residential fires, they caused 35.2% of residential fire deaths.⁴ This disproportionate number of deaths occurs because cigarettes frequently produce a low, smoldering fire that does not become apparent for some time. Thus, a cigarette dropped at 11 p.m. may not cause a visible fire until after everyone in the household is in bed. Thus, while there might be some added danger from the increased use of matches and lighters, the fires they cause are likely to be immediately obvious, and the consequences far less fatal.

Use of the Term "Fire-Safe Cigarettes" Will Not Cause Smokers to Take Increased Risks. The outline of issues for this committee raises the question whether use of the designation "fire-safe cigarette" will give smokers a false sense of security and lead them to take new risks. We think this is extremely improbable.

If legislation passes requiring all cigarettes to be fire-safe, no one after that will talk about fire-safe cigarettes, as such, because it will not be a basis for distinguishing between one brand and another. It won't be advertised or listed on the package as "fire-safe."

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In fact, we suspect that the industry will try its best to preserve existing brands and brand names, since they've got a considerable investment in building customer loyalty. They will make sure that changes are minimal, and as a result, few people will even know that they're smoking a "fire-safe" cigarette.

We call your attention to the many other fields where building or product designs have been altered to improve fire safety. There is no indication that people are taking greater risks with their children's sleepwear, or that they're more willing to do dangerous things because they live in a building with plaster walls.

If products are functional, most people simply accept them as they are. They generally do not know or care that safety or some other public purpose has affected the design. Cigarettes will be no exception.

Data on Cigarette Fire Losses

All of the available data show that cigarettes are, by far, the leading cause of residential fire deaths. We rely primarily on U.S. Fire Administration data. Their most recent National Estimates, for 1981, attribute the following losses to smoking materials:⁵

63,518 residential fires, or 8.9% of all residential fires;

2,144 residential fire deaths, or 35.2% of the total;

3,819 residential fire injuries, or 19.0% of the total;

\$305 million in residential property losses, or 10.3% of the total.

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We call your attention also to a recent study by the Johns Hopkins University School of Hygiene and Public Health, entitled "Fatal House Fires in an Urban Population." This study found that 39% of the victims of fatal cigarette fires were people other than the smoker. 6

Within the category of "Smoking Materials," the U.S. Fire Administration does not give any further breakdown among cigarettes, cigars, pipes, matches, etc. Nevertheless, there is every indication that cigarettes are responsible for the vast majority of these losses.

To begin with, cigarettes are far more common than cigars or pipes. The American public consumes over 600 billion cigarettes each year. Furthermore, as any cigar or pipe smoker can tell you, their devices are already self-extinguishing, sometimes to an irritating degree.

As between cigarettes and the matches or lighters used to light them, the evidence again points to the cigarette as the cause of most fires. The attached chart shows fire deaths from various causes versus time of occurrence. Notice that smoking fire deaths peak in the early morning hours. This points to a smoldering mechanism, something that requires some time before it becomes apparent -- in other words, the cigarette, not the match.

In fact, we've never seen the data on cigarette fire involvement seriously challenged. Tobacco industry spokesmen sometimes deride the data by suggesting that fire investigators blame

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smoking when they can't find any other cause. But the data showing that cigarettes play a large role are confirmed by another Johns Hopkins University study. In this one, researchers from the Applied Physics Laboratory studied all fires in Maryland from 1971 to 1977, where someone died within six hours of the fire.⁷ Forty-seven percent of these fatal fires were caused by smoking materials. Their data is especially credible because trained researchers actually examined the scene of each fire. They did not rely on local officials, whose expertise might vary, especially in small communities.

The important point to draw from all this data is simply that cigarettes play such a large role in causing fire fatalities that we cannot hope to get the overall fire problem under control unless we can control the cigarette-caused portion of it. And to accomplish this, mandating safer cigarettes is by far the best strategy.

Alternative Approaches to the Cigarette Fire Problem are not as Promising.

The IAFC issue paper suggests several alternative approaches to the cigarette fire problem: public education, a more fire-resistant living environment, smoke detectors and residential sprinklers. All of these have serious drawbacks when compared to safer cigarettes.

Education: We are not optimistic about education as a means to solve the cigarette fire problem. It has been the primary

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approach used up until now, and the problem is still very much with us.

The target audience for this education may be largely impervious to the message. The 1971-77 Johns Hopkins Study of Maryland fire deaths found that many of the victims of cigarette fires had enough alcohol in their blood to be legally intoxicated. If these people are habitual heavy drinkers, they may be beyond the reach of education programs. And even if they were only occasional drinkers who were drunk at the time of the fire, there is obviously a question of whether they could, at that moment, apply the lessons of any past education.

Furthermore, there is a 1972 study by the Insurance Institute for Highway Safety that calls into sharp question the ability of public education to affect safety-related habits generally.⁸ The Institute went to a city with two separate cable TV networks. On one, they broadcast a series of hard-hitting advertisements promoting seat-belt usage; on the other, no such ads. They stationed observers around the town to note whether motorists wore their belts and to record their license numbers. These numbers were then traced to individual homes, to see which of the two cable channels that home received.

After nine months of this experiment, there was no statistically significant difference in seatbelt usage between those who saw the TV ads and those who did not. Admittedly, this result may not be directly transferrable into residential fire safety education. But it has ominous implications that the advocates of greater safety education have never fully explored.

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A fire-resistive environment: 25 years away. The IAFC issue paper also raised the question of a more fire-resistant living environment. The Citizens Committee is following very closely the efforts of the Consumer Product Safety Commission to improve the fire safety of upholstered furniture, and especially to improve its resistance to cigarette ignitions.

Although there are some promising results to this work, there are several serious drawbacks. First, we must consider that upholstered furniture is a major consumer purchase, and remains in use for perhaps 15 to 20 years. Thus, even if we began today making only fire-resistant furniture, it would be 20 years before we replaced the unsafe furniture currently in American homes. The poor and the elderly, who suffer a disproportionate number of fire deaths, would probably be the last to get rid of the old furniture.

Contrast this with cigarettes. Most cigarettes remain in the stream of commerce for a few months at most, and are completely consumed within a few days of purchase. If we could start making only fire-safe cigarettes, the change-over would be complete within a few months.

There is also a question of economic burden. The furniture industry in America is characterized by a large number of small manufacturers. Mandatory changes in product design and manufacturing processes to improve product safety impose a relatively large burden on such small companies.

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The cigarette industry, on the other hand, is made up primarily of a very few large companies. They could much more easily absorb the costs associated with changing their products.

Smoke detectors: Smoke detectors also have severe limitations for dealing with cigarette fires. Obviously, they're a very important development and every home should have at least one. But for the slow, smoldering fire often produced by a cigarette on upholstered furniture, the warning may not come in time. Consumers Union found in its 1980 tests of smoke detectors that the average response time of photoelectric detectors to a slow fire was 26 minutes, while for ionization detectors it was 48 minutes.⁹

Furthermore, the data on alcohol involvement in cigarette fire deaths suggest that many potential victims, even if they are alerted by a smoke detector, will be disoriented and may not respond properly.

In any event, it is important to realize that when the detector goes off, the fire is already underway. At that point, there are always a host of dangers and uncertainties. Early warning, important as it is, will never be as good as preventing the ignition.

Sprinklers: Sprinklers also will not solve the problem of cigarette fire fatalities. A significant number of cigarette fires produce lethal concentrations of smoke and gases in the smoldering phase, before they ever erupt into flames. In other words, these fires will kill the occupants before the sprinkler activates.

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Furthermore, it seems unrealistic to think that most homes will ever have sprinklers in the living quarters. If they do, it is still decades away. And again, the poor, the most frequent victims of fire, will be the last to have sprinklered homes.

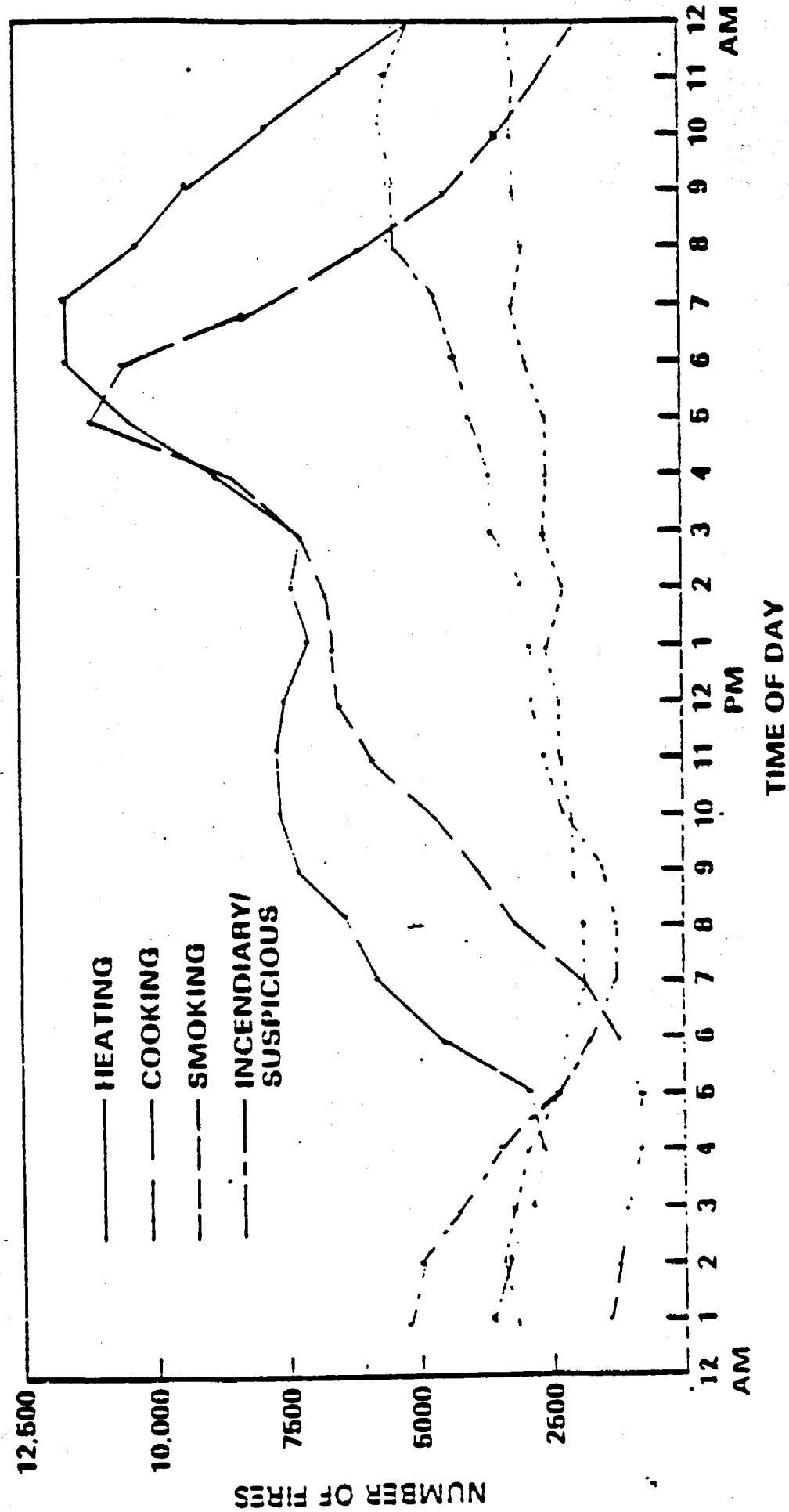
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FIGURE 20: 1980 RESIDENTIAL FIRES BY TIME OF DAY



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SOURCE: NF

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FIRE DEPARTMENT

250 LIVINGSTON STREET BROOKLYN, N.Y. 11201-5884

JOHN J. HART
Chief of Department

November 21, 1983

Chief William Stamm
Milwaukee Fire Department
711 West Wells Street
Milwaukee, Wisconsin 53233

COMMITTEE MEMBER

Dear Bill:

I am writing to give you my thoughts on the IAFC special committee meeting on self-extinguishing cigarettes. First, let me congratulate you on putting together such a distinguished and knowledgeable group of panelists, and also for the calibre of the witnesses you brought in to testify. To my mind I thought it was highly successful and I also felt that we have been given sufficient information to recommend a position that the IAFC should adopt.

Before I suggest my recommendations, I would like to give you some of the conclusions I drew.

- a. There is a great variety of opinions as to what constitutes a self-extinguishing cigarette in terms of standards.
- b. The testing done to date by the National Bureau of Standards was insufficient to determine a standard and was not broad enough to be a practical substitute for the actual burn situation.
- c. There is not currently a cigarette on the market that can be classified as self-extinguishing. The two example brands cited, "More" and "Sherman" cannot reasonably be classified as cigarettes as used by the American public. They are both, long, thin, brown, strong and harsh, more akin to small cigars than cigarettes.
- d. There was no testimony offered that would indicate that a technology is available that could create a self-extinguishing cigarette without altering what is commonly perceived as a cigarette. The two example brands, both "More" and "Sherman" were constructed of pipe tobacco rather than cigarette tobacco and had a substantially higher tar and nicotine content.

(Cont'd...)

SMOKE DETECTORS SAVE LIVES

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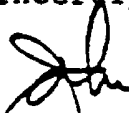
- e. Any method of gaining a reduction in the burning propensity of a cigarette that would result in a higher tar and nicotine content would be foolhardy, in light of the evidence, linking smoking to cancer. Since our sense of morality must lead us to the preservation of life, the saving of two lives by fire at the expense of 10 dying by cancer cannot in my mind be justified.
- f. The proposed legislation HR 1880 does not include any consideration of the health impact of any proposed fire safe cigarette and should not be supported.

In light of these thoughts I would recommend the following to the IAFC.

- 1. Support HR 1880 or any other legislation that included,
 - a. The requirement to conduct tests that would establish a standard for self-extinguishing cigarettes that pertained across a wide range of substrates and across a range of probable fire scenarios.
 - b. Provide that once a standard is established, all products measured to that standard must also show that they do not create a health hazard in another area.
 - c. While the CPSC retain jurisdiction over the project, the legislation include a panel to determine feasibility of any standards before they are established.
 - d. The panel consists of a broad spectrum of interested parties, i.e. industry representatives, medical specialists, consumer advocates, fire chiefs, etc.

Good luck in putting everyone's thoughts together.

Sincerely,


John J. Hart
Chief of Department

JJH:mv

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Center for
Firesafety
Studies

December 2, 1983

William Stamm, Chief
Milwaukee Fire Department
711 West Wells Street
Milwaukee, Wisconsin 53223

Dear Bill:

As we agreed at the committee meeting, I have attempted to summarize my thoughts on the issues associated with so-called self-extinguishing or reduced ignition hazard cigarettes and the proposed federal legislation in the area of cigarette safety.

Let me begin with the issue of technical feasibility. I believe that it may be possible to design a cigarette with reduced ignition potential...perhaps through control of burning rate and ember diameter. Whether or not this can actually be accomplished has not been demonstrated by research specifically directed to that objective, to the best of my knowledge. However, the fact that some cigarettes appear to have lower ignition potential than others for certain fabrics does point to the need to have the possibility explored in detail if it is possible that lives could be saved. Incidentally, I believe that self-extinguishment in the time necessary would most likely result in changes to the chemistry of the smoke produced. This leads to the next issue... the health hazard.

Whether or not individual people believe that smoking causes lung cancer, I don't know of anyone who will say that it's good for you. For many people, the statistics and medical data appear to be convincing with respect to lung cancer and a variety of cardiovascular disorders. If, in the attempt to reduce fire deaths and injuries an increase could be created in deaths and disease from smoking related causes, that fact and the possible magnitude of the effect must be known, or at least, carefully examined.

The total effect of fire losses must also be considered. In addition to deaths, the costs in burn care and physical and mental rehabilitation have to be included.

In order to put the risks and benefits of the pending legislation in perspective, I believe that a risk analysis should be part of any study of the technical issues.

Before summarizing my summary, I would like to mention two other issues... regulatory action at the state level and the regulatory aspects of the federal legislation. In order to allow time for the technical issues to be studied and resolved (if possible), I believe that state level legislation should be

delayed until the end of the study provided that the federal legislation requires a decision to be made regarding federal regulation within a reasonable time after conclusion of the study. I believe that the CPSC is the most appropriate agency to deal with the regulatory decision. Should the federal government decide not to regulate, states would then have the technical facts to study and would be free to pursue their own legislative directions.

Since there are several bills and proposed changes being considered at the moment, I will list those items that should be included in a cigarette safety bill that the IAFC could support.

1. The bill should require a study of both the technical feasibility and the risk-benefit of regulation.
2. The bill should require a regulatory decision at the completion of the study. CPSC should be the lead agency.
3. State legislation should be delayed only until a decision has been made at the federal level.
4. An advisory board should be established that is composed of technical people representing at least CPSC, NBS, FEMA (IAFC?), and NFPA. Technical representatives from industry and medical experts in the field of cigarette-related diseases and burn injuries should also be included.
5. The research should be done by or coordinated through the Center for Fire Research at NBS.

Those are my thoughts as I have developed them since our meeting in New York. Over all, I felt that neither "side" made a convincing argument for their position. I do feel that NBS is on the right track regarding the test method. The effects of the cravice and the final criteria for performance still need to be addressed.

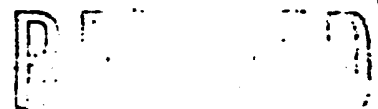
I must say Bill, that I enjoyed having the opportunity to meet you and that I think the meeting went well. I am sorry that I was not able to stay longer so that we could have had more time for discussion. I hope that my comments are helpful and I look forward to seeing a draft of what pull together from our various comments. If you have any questions on any of the above, let me know.

Very truly yours,

Richard

Professor Richard L.P. Custer
Associate Director

RLPC:11b



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November 21, 1983

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Mr. William Stamm, Chief
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City of Milwaukee
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Dear Chief Stamm:

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Associate Director

Please let me thank you on behalf of myself and my associate, Klaus Brunnemann for inviting us to participate in the ad hoc committee meeting on "Fire Safe Cigarettes". We learned a lot and are in full support of your leadership in clarifying the issue of the self-extinguishing cigarette.

Please find attached our ideas on the development of "Fire Safe Cigarettes".

With best wishes,

Dietrich Hoffmann
Dietrich Hoffmann, Ph.D.
Associate Director

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Encl.

WARD B. KLARBERG, Esq.
Deputy Vice President
General Counsel

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"FIRE SAFE CIGARETTES"

Based on our experience, our knowledge of the technical literature, and discussions at the meeting of the ad hoc committee on "Fire Safe Cigarettes" of the International Association of Fire Chiefs, New York, November 16, 1983, we offer the following suggestions.

I. In principle, the pending bill H.R. #1880 on "Fire Safe Cigarettes" introduced by Congressman J. Moakley offers a satisfactory basis for initiating studies on self-extinguishing cigarettes. However, it appears that the task is very complex and one could not hope to arrive at scientifically sound conclusions after only 2 years of research, since major efforts have to be directed towards evaluations of the toxicological properties of the self-extinguishing cigarettes. It would be unwise to disregard the potential for increased toxicity of the smoke that might result from cigarettes which are modified to self-extinguish.

II. We would envision a step-by-step development of the program along the following guidelines.

1. Testing method.

Establish standardized methodology to determine the potential of ignited cigarettes to inflame upholstered furniture made

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of various fiber materials. The method of John Krasney, U.S. National Bureau of Standards, is a good beginning, but does not include testing smouldering cigarettes in furniture crevices. Consideration should be given to the use of thermocouples with a recording device which would register the radiant heat emitted from the burning cone of a cigarette into the various fibers. The measuring device used for this purpose should give reliable readings at various degrees of humidity of the ambient air (20-70% R.H.).

2. Determination of tar, nicotine and carbon monoxide.

Upon development of standard measuring devices for the inflaming potential and subsequent approval of these devices by the U.S. Bureau of Standards, the development of experimental cigarettes should begin with those modifications that appear to have the most promising potential for a fire-safe cigarette. Treatment of the cigarette paper and changes in the diameter of the cigarette are two important considerations in this regard.

Toxic agents such as silicates should not be utilized for paper treatment, nor as additives to tobacco. Candidate cigarettes holding promise to qualify as "self-extinguishing" should generate no more than 10 mg of tar, 1 mg of nicotine, and 10-12 mg of carbon monoxide in their mainstream smoke when measured under FTC-standard smoking conditions.

3. Smoke analyses.

If a candidate cigarette fulfills these criteria, mainstream smoke yields must also fall within acceptable ranges for the following compounds:

- a) Gas Phase: formaldehyde, acrolein, acetaldehyde, benzene, toluene, hydrogen cyanide, ammonia, nitrogen oxides, carbon monoxide, carbon dioxide, acetonitrile, and volatile N-nitrosamines
- b) Total Smoke: pH
- c) Particulate Phase: in addition to "tar" and nicotine, volatile phenols, catechol, aromatic amines, quinoline, benz(a)anthracene, benzo(a)pyrene (and possibly other carcinogenic aromatic hydrocarbons), and the tobacco-specific N-nitrosamines

The mainstream smoke yields of the aforementioned compounds should not significantly exceed corresponding emissions from untreated cigarettes with identical tobacco or blend.

4. Bioassays.

If all qualitative and quantitative analytical parameters of the smoke of the candidate self-extinguishing cigarette are satisfactory, bioassays have to be completed for evaluation of toxic, mutagenic, carcinogenic, and cocarcinogenic potential of

the smoke of the modified cigarette. These evaluations would include the Ames test for mutagenicity, assays for carcinogenicity and cocarcinogenicity of tobacco smoke particulates on mouse skin and inhalation of whole smoke with Syrian golden hamsters.

5. Clinical assays.

The candidate self-extinguishing cigarette emerging from the screening process described above with negative toxicity data must be submitted to clinical assays with at least 10 volunteers who are long-term (>10 yrs) cigarette smokers. These volunteers would be asked to smoke the control cigarette for 2 weeks and then switch to the candidate cigarette for the next 2 weeks. At the beginning and at the end of the assay for each cigarette, volunteers' blood pressure will be measured and blood samples will be taken. Carboxyhemoglobin, nicotine, cotinine, and thiocyanate will be measured in the blood samples. The readings and assay data obtained should not reflect greater uptake of smoke components than those seen with the control cigarette (untreated, unmodified). The candidate self-extinguishing cigarette can be considered a viable product only when all aspects, the pyroquality, tar and nicotine yields, analytical smoke profiles, bioassays, and clinical assays are satisfactory.

We realize that the taste characteristics, i.e. the smoke flavor of an experimental cigarette, must be consumer acceptable.

We have not discussed this aspect since it falls into the realm of the cigarette manufacturers' evaluation.

Technical details and references needed for the above discussed outline can be supplied by us. For the development of "Fire Safe Cigarettes" it will be necessary to assemble a Technical Committee. In our judgment, this technical advisory group should be made up of representatives from the International Association of Fire Chiefs, tobacco scientists and fire experts from the industry, academic institutions, U.S. government, and physicians with expertise in respiratory physiology.

Respectfully submitted,

Dietrich Hoffmann

Dietrich Hoffmann

Associate Director

Klaus D. Brunnemann

Klaus D. Brunnemann

Head, Section of Bio-
Organic Chemistry

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December 2, 1983

Chief William Stamm
Milwaukee Fire Department
711 W. Wells St.
Milwaukee, WI 53233

Dear Chief:

Listed below are my recommendations to the IAPC special committee meeting on the self-extinguishing cigarette:

1. I would endorse research to establish a standard methodology to measure the self-extinguishing characteristics of cigarettes. This test should cover a wide range of substrates.
2. Once a cigarette is developed which has acceptable self-extinguishing properties, its products of combustion must be quantitatively identified. If these substances differ in any significant degree from those which have been identified in cigarette smoke, the appropriate animal toxicology studies must be done before any consideration for legislation to market the cigarette is endorsed.
3. I advocate that all phases of the research be under the supervision of a panel of experts chosen from multiple disciplines, i.e. medical toxicology, fire specialists, tobacco industry scientists, and consumer advocates.

Sincerely yours,

A handwritten signature in cursive script that reads "Rich".

Richard D. Stewart, M.D.
Corporate Medical Director

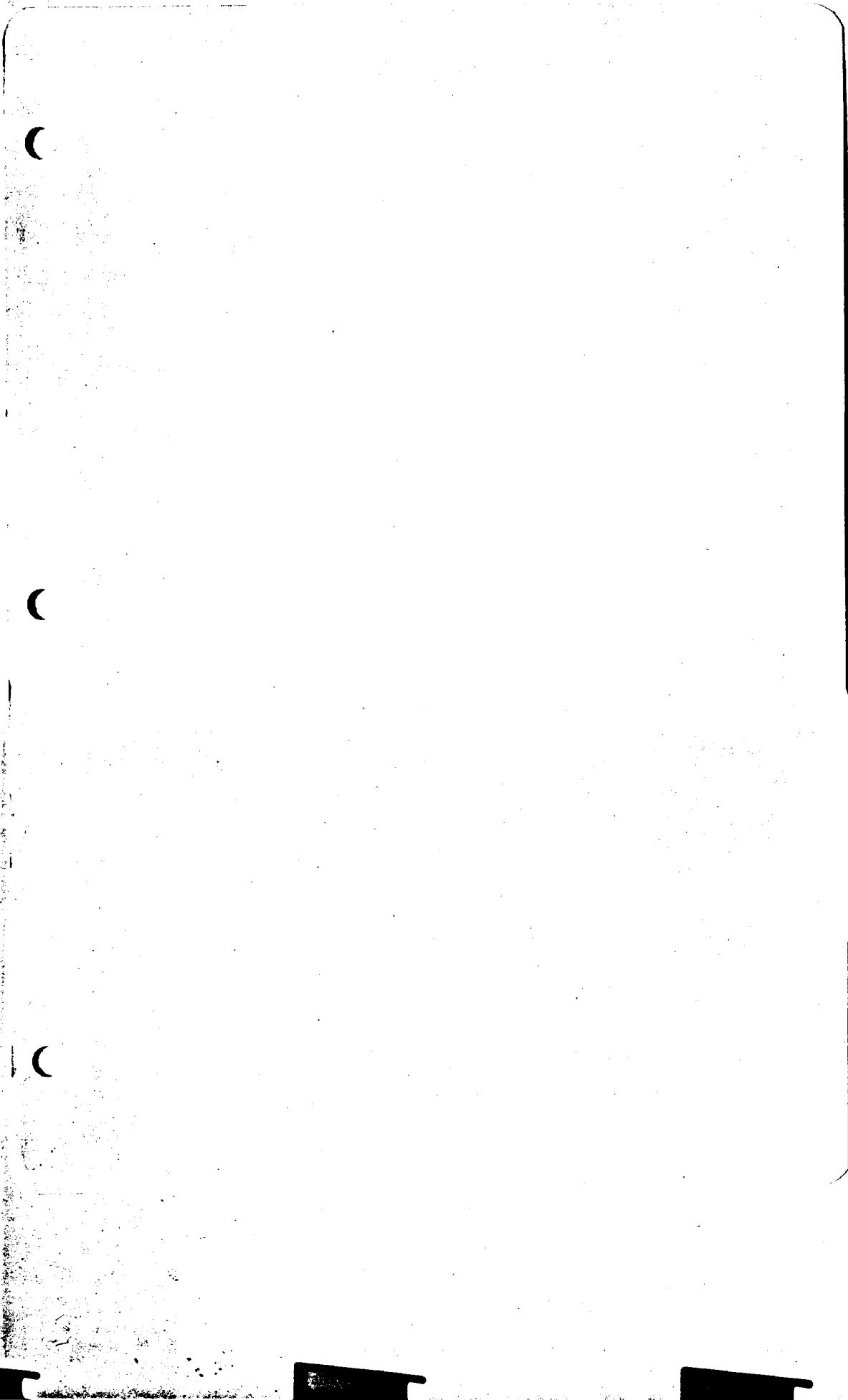
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OFFICE

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UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION

NOV 25 1983

The Chairman

Chief William Stamm
Fire Department
City of Milwaukee
711 West Wells St.
Milwaukee, WI 53233

Dear Chief Stamm:

Thank you for your letter of October 27, 1983. You indicated in your letter that the International Association of Fire Chiefs has formed an ad hoc committee on fire safe cigarettes to determine the pros and cons of "self-extinguishing" cigarettes. The Association is to be commended for undertaking work in this area.

As requested, the Commission staff has prepared responses to the series of questions included with your letter. These are attached. I hope these will be of some assistance to your committee.

If we can be of any further assistance, please let me know.

Sincerely,



Nancy Harvey Steorts
Chairman

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MILWAUKEE FIRE DEPT.
OFFICE OF THE CHIEF

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IAFC AD HOC COMMITTEE ON FIRE SAFE CIGARETTES

New York City - November 16, 1983

Points to be Cleared Up

Data

Question 1. What is the magnitude and nature of the part of the fire problem involving cigarettes and other smoking materials? (This includes number of fires deaths, injuries, dollar loss; typical fire scenarios; reliability of the available data; trends over the last five years; 1982 update.)

Answer:

CPSC estimates of the number of fires, deaths, and injuries associated with smoking materials is presented in the attached table. These data cover the five years between 1978 and 1982. In this table, estimates of the total number of residential fires, deaths, and injuries were obtained from the National Fire Protection Association (NFPA). The proportion of these fires related to smoking materials was obtained from data supplied by the U.S. Fire Administration (USFA). Cigarette ignitions constitute more than 95% of the smoking materials related fires.

The products most frequently ignited by smoking materials are upholstered furniture and mattresses/bedding. Typically smoking materials, primarily cigarettes, are involved in the ignition sequence when someone falls asleep smoking or else improperly discards the smoking material before leaving the area. Such fires often smolder for hours, and may be especially insidious for family members who are asleep or unaware of the fire until it has reached an advanced state. These are often multiple casualty fires; it is frequently not just the smoker himself who becomes the victim. Alcohol is often a factor in these incidents. When upholstered furniture is involved, ignition generally occurs in the crevice or welt areas around or between the cushions. The location of ignition and the precise ignition sequence are not clearly known for fires involving mattresses and/or bedding. The Commission is currently involved in a priority project to investigate the hazard scenario associated with these fires.

Alternative Approaches

Question 2. What are the alternative approaches to reducing smoking-related fires and fire losses? (This includes alterations to the cigarette; behavioral education; improving fire resistivity of the environment; use of detectors and sprinklers; and other ideas.)

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Answer:

A variety of approaches can be visualized to reduce the frequency of fires caused by smoking materials. The most direct method would be to modify the ignition source, the cigarette, to reduce its propensity to ignite other materials. On the other hand, the fuel source, usually furniture or bedding, could be modified to reduce its susceptibility to cigarette ignition.

Less direct approaches to reducing fire losses include a) fire detection (smoke detectors) to provide occupants with early warning of fires to improve escape potential, b) fire suppression (sprinklers, fire extinguishers) to put out fires before significant casualties occur, and c) consumer education to alter consumer behavior patterns to avoid potentially hazardous situations.

The Commission strongly believes that all of these approaches should be pursued. The Commission, in fact, is now actively engaged in such actions. However, you are probably aware that the Commission is prohibited by law from regulating cigarettes. Therefore, the Commission's primary approach to reducing deaths and injuries from smoking related fires has been to improve the cigarette ignition resistance of those consumer items most likely to be ignited by cigarettes, that is, mattresses and upholstered furniture.

A federal standard requiring all mattresses to resist cigarette ignition was promulgated in 1972. A recent check by the Commission and by the State of California indicates a high level of compliance with the mattress flammability standard. There still are, however, approximately 1000 deaths per year resulting from bedding fires. This includes fires started by cigarettes and open flames. The Commission has a program in progress to determine the causes of such fires, and thereby, actions needed to reduce the number of fires and deaths. The results of this program are expected to be available in the second half of 1984.

In the upholstered furniture area, the Commission is working with industry's Upholstered Furniture Action Council (UFAC) to develop upholstered furniture more resistant to cigarette ignition. Improvements in the cigarette ignition of upholstered furniture have been achieved. A Commission check in 1980 indicated that approximately 50% of the furniture constructed to the UFAC requirements resisted ignition. Since that time additional modifications have been found which can be expected to further increase the cigarette ignition resistance. These modifications were incorporated into the UFAC voluntary program in July 1983. The Commission has a program underway to obtain and test residential furniture

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constructed in accordance with the latest UFAC requirements. The results of this program are expected to be available mid 1984.

In addition to the work on mattresses and upholstered furniture, the Commission has a priority outreach program on smoke detectors with the objective of a smoke detector in every home by the end of 1983.

Cigarette Technology and Self-extinguishing Issues

Question 3. What are "self-extinguishing" cigarettes?
(This includes the issues of their time to extinguish in order to be called self-extinguishing; their reliability of going out within a certain time; the ways in which a cigarette can be made self-extinguishing; and whether removing additives will lead to self-extinguishment.)

Answer: The Commission has not carried out any work on cigarettes, but would refer the committee to the National Bureau of Standards (NBS) for a knowledgeable answer to this question. We would note that there appears to be some tendency in the popular press to use the term "self-extinguishing" to cover not only a cigarette which will go out when not puffed, but also any other modification of the cigarette which might assist in reducing fires started by cigarettes.

Question 4. Are any existing brands of cigarettes "self-extinguishing"? (Proponents of self-extinguishing say yes; what evidence is there? What do NBS, the tobacco industry, and others say?)

Answer: The Commission has not carried out any work in this area, but again would refer the committee to NBS.

Question 5. What is the relationship, if any, between extinguishment time and the propensity to start ignition? What evidence is there that an earlier extinguishment time will materially reduce the number of fires and fire deaths and injuries? What fraction of deaths might be prevented? (This includes the theory of smoldering ignition; data from the field; test data, if any; upholstered furniture and bedding prevalent among current fire victims, especially in households of the poor and elderly.)

Answer: The Commission has not carried out programs to determine the specific relationship between extinguishment time and the propensity to start ignition. Past work with mattresses and upholstered furniture indicated that the time to ignition by a burning cigarette can vary over a relatively wide range depending on such factors as the materials used in the mattress or furniture items and the location of the burning cigarette. We have observed that, in general, cigarettes that burn longer are more likely to

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start fires. We have no information to estimate what fraction of the deaths might be prevented. Please refer to NBS for additional information.

Question 6. By what criteria can a cigarette be tested to determine its relative fire safety? Is there a reliable test to do so? (This includes considering how to test in light of the wide variety of upholstered furniture and bedding.)

Answer: The Commission has not carried out any work in this area. NBS may have some input to this question.

Side Effects

Question 7. Will tar and nicotine levels be raised by making cigarettes self-extinguishing? By how much? Will that have potential health impacts? What is the risk, if any? How does it compare to potential gains in fire safety?

Answer: The Commission has not carried out any work in this area, and therefore cannot comment.

Question 8. What unwanted fire-related behavior, if any, might be caused by requiring smokers to relight self-extinguishing cigarettes? Will there be any negative impacts on others stemming from the smoker's need to relight more frequently? (Considerations here include increased use of matches and lighters, increased spread of matches and lighters for smokers' convenience, access by children, decrease in manual dexterity of the elderly.)

Answer: The Commission has not carried out any work in this area.

Question 9. What unwanted fire safety behavior or attitudes might be caused by calling cigarettes "fire safe." (Is there any precedent? Is there likely to be any change in people's attitudes toward fire? Will smokers be more careful or careless?)

Answer: The Commission has not carried out any work in this area.

Adequacy of Information

Question 10. Is the current technical information adequate enough to make a reasonably confident decision regarding the net benefits of self-extinguishing? If not, what other research is needed?

Answer: Only limited information is available on the time of ignition (time at which self-sustained combustion starts) of upholstered furniture from cigarettes. Such information

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for a wide range of materials and constructions would be needed to establish the potential benefits from self-extinguishing cigarettes. Other approaches, such as the development of a cooler burning cigarette, may be a better approach.

IAFC Position

Question 11. What should the IAFC position be?
(This should include its stance relative to national legislation.)

Answer: The Commission supports the purpose of proposed legislation such as the "Cigarette Safety Act," to establish a technologically practicable and economically feasible performance standard for cigarettes to reduce the hazards which they present as an ignition source. IAFC may wish to consider a similar position.

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FIRES AND FIRE CASUALTIES RELATED TO SMOKING MATERIALS
(1978-1982)

IGNITION SOURCE AND ITEMS IGNITED	YEAR					% change 1978-82
	1978	1979	1980	1981	1982	
<u>FIRES</u>						
TOTAL RESIDENTIAL	757,500	721,500	757,500	733,000	676,500	-10.7%
SMOKING MATERIALS	94,600 (100%)	84,800 (100%)	79,400 (100%)	70,700 (100%)	56,400 (100%)	-40.4%
UPHOLSTERED FURN.	27.4%	26.8%	28.2%	29.1%	28.4%	
MATTRESSES/BEDDING	33.2%	33.9%	35.2%	35.2%	34.9%	
OTHER	39.4%	39.4%	36.6%	35.7%	36.6%	
<u>DEATHS</u>						
TOTAL RESIDENTIAL	6,800	5,800	5,500	5,600	5,000*	-26.5%
SMOKING MATERIALS	2,430 (100%)	2,370 (100%)	1,980 (100%)	2,130 (100%)	1,730* (100%)	-28.8%
UPHOLSTERED FURN.	50.8%	48.0%	54.5%	52.9%	54.2%	
MATTRESSES/BEDDING	35.7%	27.6%	27.6%	28.9%	27.5%	
OTHER	13.6%	24.4%	17.9%	18.1%	18.3%	
<u>INJURIES</u>						
TOTAL RESIDENTIAL	56,100	52,100	53,000	52,400	41,800*	-25.5%
SMOKING MATERIALS	10,750 (100%)	9,820 (100%)	9,420 (100%)	9,510 (100%)	6,200* (100%)	-42.3%
UPHOLSTERED FURN.	37.7%	39.7%	40.5%	42.2%	40.4%	
MATTRESSES/BEDDING	36.0%	38.2%	35.9%	36.2%	34.8%	
OTHER	26.2%	22.1%	23.6%	21.6%	24.7%	

* Data now under analysis, and estimates are subject to change.

Source: NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
U.S. FIRE ADMINISTRATION (USFA)
U.S. CONSUMER PRODUCT SAFETY COMMISSION - EPIDEMIOLOGY

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