

FIRE-SAFE CIGARETTE ISSUE: AN OVERVIEW

The purpose of this overview is to set forth the basic positions of the industry with respect to various aspects of the fire-safe cigarette issue. It will endeavor to anticipate and provide responses to questions which may arise at a congressional hearing.

I. HISTORICAL BACKGROUND

This section will briefly summarize the recent history of this issue. In 1979 and 1980, contemporaneous with the filing of lawsuits involving cigarette-related fires, Andrew McGuire and others began to encourage legislation at the federal and state levels to require that cigarettes be made "fire safe". In support of this effort, many of the claims made by the proponents of the legislation were unfounded and were based upon misinformation. The proponents cited the presence of existing patents for fire-safe cigarettes and claimed that certain European and U.S. cigarettes (Sherman, More and Carlton) were "fire safe".

The industry's general response was to the effect that cigarette manufacturers strongly desire to reduce the incidence of accidental fires, including those involving the careless use of

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cigarettes and other smoking materials. The smoking public is aware of the potential fire risk presented by a lighted cigarette and 99.99% of cigarettes are properly extinguished. Nevertheless, through carelessness, accidents happen and tragic fires may result. The manufacturers had reviewed patent and scientific literature and based on their expertise did not believe an acceptable product could be made which would not start fires. The companies were independently pursuing research.

Through various activities, the Tobacco Institute endeavored to broaden the issue to focus on prevention efforts directed at all accidental fires. In addition, the Institute engaged in a cooperative research project with UFAC, a furniture manufacturers association, to investigate cigarette ignition of upholstered furniture materials.

The Institute developed contacts with fire services primarily at the state and local level. The focus of this effort was in two areas. First, direct support was given to local fire departments by providing public relations materials to assist the departments in fund raising and firemen recruitment, and providing audiovisual equipment, pamphlets, slides and films to aid in fire prevention presentations. The second area involved developing

fire prevention materials targeted to those shown to be the most likely victims of home fires: urban low-income, elderly and disabled persons. Materials were also developed for use with elementary and high school students. The materials were designed to increase awareness of fire prevention and detection techniques, including promotion of the proper installation and maintenance of smoker detectors. The Institute's efforts were well-received by many in the fire services who have been generally supportive on a number of issues.

The industry continued to oppose legislative proposals in various states. The proposals called for "quick fix" legislation to what was obviously a very complex scientific matter. Most of the proposals would have required cigarettes to go out in a given time period and delegated the regulatory authority to a State Fire Marshall whose office had no expertise, limited facilities and inadequate resources. At the federal level, the industry met with Congressional and Senate proponents (principally Mass. Congressman Joe Moakley and Calif. Senator Alan Cranston in an effort to arrive at a sensible piece of legislation. The result was the Cigarette Safety Act of 1984 which created an Interagency Committee ("IAC") consisting of the Chairman of the Consumer Product Safety Commission, the U.S. Fire Administrator and the Assistant Secretary of

Health and Human Services. A Technical Study Group ("TSG") was also created to perform an investigation "to determine the technical and commercial feasibility, economic impact, and other consequences of developing cigarettes and little cigars that will have a minimum propensity to ignite upholstered furniture or mattresses." Under the statute, the Technical Study Group was to report its findings to the IAC which in turn was to report to Congress. The 15-member TSG was comprised of representatives from the fire services, furniture manufacturers, the American Burn Association, the American Medical Association, DHHS, and 4 tobacco manufacturer representatives (Philip Morris, Lorillard, American and Reynolds). The TSG met periodically over a period of approximately 2 3/4 years (spending more than \$2.1 million) and issued its final report to the IAC at the end of October 1987. In turn, the IAC filed its report and recommendations with Congress on December 23, 1987.

The TSG found that "it is technically feasible and may be commercially feasible to develop cigarettes that will have a significantly reduced propensity to ignite upholstered furniture or mattresses." (Emphasis added). It reached the conclusion that certain cigarette characteristics (smaller circumference, lower density tobacco, less porous paper, and reduced citrates in paper) were found in the laboratory to reduce ignition propensity. The

Group also concluded that "the differences in ignition propensity among selected current commercial cigarettes are unimportant." The TSG recommended additional research, including (1) development of a standard test method to determine cigarette ignition propensity and (2) development of "knowledge" concerning "changes in the toxicity of smoke and resultant health effects from modified cigarettes." In making its report and recommendations to Congress, the IAC accepted the findings of the TSG and urged additional testing to determine commercial marketability of "less fire-prone cigarettes," plus an evaluation of any health risks smokers might incur from such cigarettes. Copies of the IAC report and the Executive Summary of the TSG report are available for reference.

The current status in Congress is that Mr. Moakley has introduced a follow-up bill into the House and there is a similar bill in the Senate sponsored principally by Senators Cranston (Ca.) and Heinz (Pa). On April 29, 1988, a bill supported by the tobacco companies was introduced by Congressman Boucher (Va.). A comparison of the pending legislative bills is addressed under a specific heading.

Bills have also been introduced in various states that generally call for creation of a performance test and give the

companies a period of time to make products that pass the test. So far, no states have passed legislation and one was recently defeated in Minnesota.

The following sections will discuss areas of possible inquiry and provide response positions.

## II. TSG RESEARCH, FINDINGS AND RECOMMENDATIONS

The findings, conclusions and recommendations of the TSG are set forth in the Executive Summary of the report. This section will capulize the most relevant points and briefly discuss the research done and appropriate industry criticisms and comments.

The TSG conducted two important pieces of research using laboratory mockups of upholstered furniture materials. The work was performed principally by the National Bureau of Standards. In the first project, 12 commercial cigarettes were selected to include brands which had large market shares. This included one of the Marlboro brands. More and Carlton were also included because some researchers had claimed those brands were less ignition prone. The test results showed no statistically significant differences among the commercial brands. The TSG described the results by

saying, "differences in ignition propensity among selected current commercial cigarettes are unimportant". Identification of the cigarette brands was kept confidential and not made known to members of the TSG or the public.

The second important project involved the laboratory testing of 41 experimental cigarettes which were specifically designed to determine if changes in cigarette construction would have an effect on ignition propensity. A description of the cigarettes and results of the laboratory tests are set forth in Tables 1 and 2 of the TSG's final report which are available for reference. Based upon the results of the test, the TSG found that reduced circumference, lower density tobacco (100% expanded tobacco), low porosity paper, and cigarette paper without the addition of citrates contributed to a reduction in ignition propensity. The experimental cigarettes which had the fewest ignitions were outside the commercial range of cigarette construction in terms of tobacco density, paper porosity and paper additives.

The TSG also performed mockup testing on a few patented cigarettes which did not ignite. The cigarettes were made by the patentees and were not examined to any extent by the TSG. The

Group reported that, "Several patented approaches also offered directions for further investigation."

Based upon this research, the TSG made its finding, "that it is technically feasible and may be commercially feasible to develop cigarettes that will have a significantly reduced propensity to ignite upholstered furniture or mattresses." The TSG report went on to state that a valid and reliable test method is needed to measure reduced ignition in cigarettes. The report noted the wide lot-to-lot variation among upholstered furniture fabrics and cushion materials. This points up a major deficiency in the laboratory mockup testing, that is, there is considerable lack of uniformity between different lots of identical fabric and cushion materials made by the same manufacturer. Thus, questions can be raised regarding the validity of the test procedures used by the TSG and whether they have any relevance to furniture and mattresses found in the real world.

The report also acknowledged that consumer acceptability of the experimental cigarettes had not been tested. It noted that per puff tar, nicotine and carbon monoxide yields of some of the least ignition-prone experimental products were within the commercial range. However, the report stated that, "the toxicity

of smoke from a future low ignition propensity cigarette needs to be addressed, as would the smoke from any substantially modified commercial cigarette, before its introduction into the marketplace."

The TSG report recommends additional research, including development of a standard test method to determine cigarette ignition propensity and to develop knowledge regarding changes in the toxicity of smoke and potential health effects from modified cigarettes.

The IAC made its recommendation to Congress for a two-year study to develop and test prototype cigarettes with reduced ignition propensity for consumer acceptability and smoke toxicity, and to develop a standard ignition propensity test method. The IAC also noted that a number of questions in these areas were left unanswered by the TSG final report.

A basic response to the TSG effort would be as follows:

-- Work by the TSG is helpful, but not finished.

- Definitive findings and conclusions should not be drawn on the basis of the research performed.
  
- Important projects were not completed or attempted because of time and funding limitations.
  
- The experimental cigarettes which showed reduced ignition propensity in the laboratory are markedly different from current commercial cigarettes.
  
- Use of 100% expanded tobacco and very low porosity paper create major commercial feasibility difficulties:
  - Puffing resistance is increased approximately 3 times the normal commercial range.
  
  - Smoke composition can be expected to be altered.

- Taste and aroma will be significantly affected.
  
- As one moves away from experimental construction parameters towards less than 100% expanded tobacco and higher porosity paper, reduced ignition effects may be quickly eliminated.
  
- There are serious questions concerning the validity of the test methodology used and its relationship to furniture and mattresses in actual use.

A November 10, 1987 letter from Dr. Charles to the CPSC discusses recommendations for needed research. This letter is available for review.

The TSG made a finding that it is technically feasible to manufacture cigarettes with reduced ignition propensity. This finding was based on the fact that the experimental cigarettes had been "manufactured" by the companies. The company representatives pointed out that the cigarettes had been made experimentally and not on high-speed equipment currently in use. They noted that

technology may need to be developed in order to modify cigarette making equipment to incorporate drastic changes in cigarette design. Because the company representatives were in the minority, their observations were not heeded. However, it is accurate to say that manufacturing technology does not currently exist to produce, at acceptable commercial quality and rates, the experimental cigarettes that exhibited the lowest ignition propensity.

III. U.S. CIGARETTES CLAIMED TO BE "FIRE SAFE"

At one time Sherman, More and Carlton (100 Box) were touted as being the "solution". These claims were based on work done by John Krasny at NBS in 1980. The Sherman cigarettes which claimed to use no additives, come in various sizes, shapes and colors. These are specialty cigarettes which have limited distribution and should not be classified as "commercial cigarettes". The Sherman product tested by Krasny was a small circumference cigarette which employed very low porosity paper and yielded approximately 35.2 mg. of "tar". Krasny found that the Sherman he tested "self-extinguished" and did not cause ignitions. The industry position has been that the Sherman product is not "fire safe", is a non-commercial "specialty" product, and has very high deliveries.

Krasny said More and Carlton also showed less ignition propensity on his early tests. However, they were included in the TSG test which resulted in non statistically significant differences among the 12 commercial cigarettes, as previously discussed.

The industry's basic position, now supported by the TSG work, is that there are no commercially available fire-safe cigarettes.

#### IV. FOREIGN CIGARETTES

Claims have also been made that certain European cigarettes were fire-safe. In the course of its research, Philip Morris has investigated cigarettes from Europe and Australia. On the whole, these cigarettes are not significantly different in their ignition propensity than cigarettes made in the United States, and Philip Morris is aware of no cigarette made anywhere in the world that could be considered "fire-safe." There are French cigarettes that were found to be less likely to ignite the mockup used in the Philip Morris tests. However, these cigarettes have a unique construction. They are made with extremely low porosity,

yellow, corn silk paper. They have a very harsh taste and have very high deliveries. Philip Morris does not believe that these cigarettes represent a commercially acceptable alternative to the existing cigarettes sold in the United States.

V. PATENTS FOR "SELF-EXTINGUISHING" OR "FIRE-SAFE"  
CIGARETTES

Over the years (going back probably to the first quarter of this century) there have been over 100 patents issued for "self-extinguishing" or "fire-safe" cigarettes. Philip Morris has reviewed the patent literature and determined that, while some of the ideas contained in these patents are interesting in concept, each contains fundamental objections which prevent actual use. For example, a number of the patents call for the addition of various inorganic chemicals and other materials to tobacco or cigarette paper to make them self-extinguish. Many of these materials have known toxic effects and others are of questionable toxicity. For this reason, Philip Morris does not add these chemicals to its cigarettes.

Some patents call for the use of fire barriers mid-way down the tobacco rod to extinguish the cigarette at a given point.

These patents fail to meet the goal of fire safety and would likely ignite a flammable substrate prior to reaching the fire barrier. Cigarettes burn slower when placed on a substrate (e.g., a couch or mattress) than they burn in air. A cigarette designed to extinguish within three to five minutes in air could burn ten to fifteen minutes on a substrate before reaching a fire barrier. By this time, most flammable substrates will have ignited. Many of these fire barrier patents call for the use of inorganic materials which are not acceptable for use in cigarettes and many also present difficult manufacturing problems. There also are obvious subjective problems with cigarettes which extinguish because of fire barriers.

Some patents would require coating the cigarette paper with various materials which reduce the porosity (permeability) of the paper and cause the cigarette to self extinguish. Most of these call for the use of unacceptable inorganic chemicals or other materials which introduce questions of toxicity. Also, the use of very non-porous paper in cigarette construction affects the efficiency with which the tobacco burns and increases deliveries of tar, nicotine and other components. This is inconsistent with the industry's efforts over the years to meet consumer demand for cigarettes with reduced deliveries. Another uncertainty with low

porosity papers is a possible change in the composition of the smoke caused by less efficient tobacco combustion.

A number of patents call for the use of devices or gadgets that even a casual observer would have to conclude are wholly impractical from a technical standpoint. For example, some propose the insertion of a water balloon in the cigarette that would melt and quench the coal at a given point. Others would encase the cigarette in a movable metal or ceramic shield requiring the smoker to keep moving the shield to smoke the cigarette.

The Technical Study Group received samples of patented "self-extinguishing" or "fire-safe" cigarettes from five patent holders and tested them for ignition potential on a mockup test. The tests showed that these cigarettes were generally less likely to ignite certain fabrics than commercial cigarettes. The TSG did not evaluate them for technical feasibility, commercial feasibility or possible toxic effects. It concluded that "several patented approaches also offer directions for further investigation." Philip Morris has reviewed these approaches and found them to be unacceptable for the reasons stated above.

In short, Philip Morris has reviewed the patent literature. Where the patents or ideas embodied in the patents have shown promise, Philip Morris has conducted further investigation. To date, no satisfactory solution has been found. Simply because a concept is patented does not mean it has commercial value.

VI. PHILIP MORRIS RESEARCH

In the late 70s, Philip Morris began an extensive in-house research program to investigate if cigarette construction parameters could be altered to significantly reduce the likelihood of cigarette ignition. Philip Morris discovered that the ignitability of a substrate is determined to a far greater extent by characteristics of the substrate than by the characteristics of the cigarette. On the vast majority of substrates either all cigarettes ignite or no cigarettes ignite, regardless of the construction of the cigarette. It is only in a very narrow range of fabric materials that differences among cigarettes may be found. And the ignitability of these materials is not consistent from lot-to-lot or bolt-to-bolt among fabrics made to the same specifications. These findings are consistent with those of the Technical Study Group and others who have conducted research in

this area. Philip Morris was able to find a fabric which, within the same bolt, consistently showed differences in time to ignition when exposed to burning cigarettes of various construction parameters. For the most part, all cigarettes ignited this fabric, but in some cases there was a variance in the time necessary for ignition to take place. Some cigarettes ignited the fabric in one to two minutes, while others did not ignite the fabric for five minutes.

Using a furniture mockup made with the material described above, Philip Morris developed a program by which it experimented with differences in time to ignition from cigarettes made with various construction parameters. Philip Morris found that certain parameters could be altered to lengthen the amount of time necessary to ignite the fabric or, in some instances, cause the cigarette to self-extinguish on the mockup. However, there were a number of problems with these cigarette designs. In the first place, it is very difficult to extrapolate from differences in time to ignition on this mockup to any real world situation. A cigarette that will ignite a substrate in five minutes in a laboratory experiment, as opposed to three minutes, is still likely to start a fire in the real world if left to smolder unattended in a couch or bed. Also, the cigarette parameters that lengthened time to ignition usually

involved reducing the porosity of paper beyond that which is acceptable from a manufacturing and consumer acceptability standpoint or adding certain chemicals to the cigarette.

In the mid-1980's, Philip Morris scientists noticed an apparent correlation between mass burn rate and cigarette ignition propensity on various types of mockup tests. Cigarettes with low mass burn rates seemed to perform better on these tests than cigarettes with high mass burn rates. Philip Morris has continued to perform research, which is highly proprietary, to develop a cigarette with a lowered mass burn rate that would be subjectively acceptable. Three research prototypes have been developed. The first two prototypes have moderately reduced mass burn rates that cannot be considered significantly less likely to start a fire, but serve as bench marks for the project. These two models did not perform as well as controls in subjective tests. The third model has a significantly reduced mass burn rate which approaches (but does not reach) the level necessary to be considered less fire prone. This model performed very poorly on subjective tests.

Research is continuing to seek an acceptable product that will not ignite furniture or bedding materials.

VII. COMPARISON OF PENDING MOAKLEY/CRANSTON AND BOUCHER  
BILLS

The initial industry position with respect to legislation was that it is unnecessary and inappropriate because one cannot legislate science into existence. However, because of the potential passage of legislation in various states and other considerations, the manufacturers did not to oppose the compromised Moakley bill which became the Cigarette Safety Act of 1984 and called for a study of the problem. Armed with the 1987 TSG report, Moakley and Cranston have each introduced new legislation which requires the Secretary of Health and Human Services to consult with NBS and other agencies, consider the findings of the TSG, and within one year issue a fire safety standard for cigarettes to reduce the risk of ignition. The companies would have one year from the date the rule is issued to make cigarettes which would meet the fire safety standard. Enforcement of the standard would be under the jurisdiction of the FDA. The bills would not preempt states from prescribing standards which are more stringent than that issued by the Secretary of HHS.

This approach relies on the "quick and dirty" development of a test method and ignores issues of consumer acceptance and

possible adverse changes in the composition of smoke from modified cigarettes. The importance of the latter two considerations was emphasized by the IAC in its report to Congress.

Development of a valid and reliable test standard is a highly complex scientific problem. Any such test must relate in a meaningful way to the broad range of fabrics and cushion materials in use in the real world. The test must also account for the wide variance among fabrics and cushion materials ordered to the same specifications from the same manufacturer. Finally, such a test should take into account the various configurations in which a carelessly handled cigarette could be dropped onto furniture and mattresses. It is unreasonable to expect that a valid, reliable test could be developed within one year. As noted, these bills fail to even mention consumer acceptance and changes in smoke composition.

On April 29, 1988, legislation was introduced by Congressman Boucher which is supported by the Tobacco Institute. This bill would continue the IAC and substitute an Implementation Task Force (ITF) for the TSG. The ITF would consist of 8 scientists from various government agencies and outside organizations with relevant expertise, and one representative from each of 5 cigarette

manufacturers. The ITF would continue the work suggested by the TSG, i.e., attempt to develop a validated test method to determine ignition propensity, develop knowledge on changes in the composition of smoke of modified cigarettes, and assess the commercial feasibility and economic impact of manufacturing and marketing products with reduced ignition propensity. The ITF would file an interim 18-month report followed by a final report from the IAC to Congress at the end of an additional 18 months (total of 3 years).

Copies of the Moakley, Cranston and Boucher bills are available for review.

The basic position of the industry is that because of political realities, some kind of federal legislation may be necessary. The Boucher bill is hoped to be an approach which can be enacted in large part. The presence of federal legislation is important in holding off passage of "quick fix" legislation in one or more states.

#### VIII. STATE LEGISLATION

Potential passage of legislation in one or more states is a serious concern. Generally, the state proposals authorize a

government official (who has no expertise) to develop an ignition performance test in a short time (usually one year) with little or no funding. The proposals usually provide the manufacturers with a one-year period in which to produce products which will meet the performance test. So far, The Tobacco Institute has been successful in the state legislatures. But the importance of federal legislation to this effort is obvious.

IX. SUMMARY

A summary position on the overall subject should continue to express concern regarding tragic accidental fires which involve the careless handling of cigarettes and other smoking materials. The industry believes that proposed solutions through modifications to the cigarette raise complex scientific questions which are not amenable to easy, quick-fix legislation. The industry has responded to the fire issue in a responsible way by supporting fire education and prevention efforts. It has cooperated fully with the efforts of the Technical Study Group and supports legislation to continue its cooperation in seeking answers to the questions that remain. Philip Morris continues its research for an acceptable product which will not ignite furniture and bedding materials.

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If there are additional questions or issues to be addressed, please contact Lee Stanford or Bill Crampton.