UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, DC 20207

DATE: MAY 27 2004

TO: The Commission
Todd A. Stevenson, Secretary

THRU: John Gibson Mullan, General Counsel JGM
Lowell F. Martin, Assistant General Counsel LFM

FROM: Patricia M. Pollitzer, Attorney PMP

SUBJECT: Petition CP 02-1; requesting that Commission adopt ASTM F-400 as a mandatory standard for cigarette lighters

Attached is a briefing package from the staff concerning a petition submitted by the Lighter Association, Inc. requesting that the Commission adopt ASTM F-400 for cigarette lighters as a mandatory standard. The staff recommends that the Commission deny the petition.

Please indicate your vote on the following options.

I. Grant Petition CP 02-1.

_____ _____
Signature Date

II. Deny Petition CP 02-1 and direct the staff to prepare a letter of denial to the petitioner.

_____ _____
Signature Date

III. Defer decision on Petition CP 02-1.

_____ _____
Signature Date

5/27/04

NOTE: This document has not been reviewed or accepted by the Commission.
Initial ____ **Date** 5/27/04

IV. Take other action (please specify):

_____

_____

_____

_____ _____

Signature Date

CIGARETTE LIGHTER PETITION (CP 02-1)
BRIEFING PACKAGE

April 2004

For further information contact:

Rohit Khanna, Project Manager
Directorate for Engineering Sciences
Consumer Product Safety Commission
(301) 504-7546

TABLE OF CONTENTS

ATTACHMENTS

EXECUTIVE SUMMARY

In November 2001, the Lighter Association, Inc. (petitioner) petitioned the U.S. Consumer Product Safety Commission (CPSC) to adopt the voluntary "Standard Consumer Safety Specification for Lighters" (ASTM F-400) as a mandatory standard under the Consumer Product Safety Act (CPSA). The petitioner believes that a mandatory rule is necessary to address an unreasonable risk of injury created by widespread nonconformance to the voluntary standard among imported lighters. The requirements of ASTM F-400 address the risk of fire, death, and injury associated with mechanical malfunction of lighters. This briefing package provides the Commission with available information related to the petitioner's request.

The petitioner states that most lighters imported into the U.S. do not meet the minimum safety requirements in the voluntary standard. The petitioner estimates that over 400 million lighters that are imported from China annually present an unreasonable risk of injury due to failure to conform to ASTM F-400. The petitioner provided incident data, test data showing failures of imported lighters, and press releases and recall notices from CPSC and Health Canada warning consumers of fire, injury and burn hazards associated with lighter malfunctions.

Canada and Mexico have mandatory requirements for lighters that are similar to the provisions of ASTM F-400. The petitioner states that since conformance with ASTM F-400 is only voluntary in the U.S., millions of lighters that fail to conform in Canada and Mexico are redirected to the U.S. market after being rejected by officials from those countries.

Based on the most recent data available from the National Fire Incident Reporting System (NFIRS) for the period 1994-1999, there were an estimated total of 330 residential structural fires that were caused by lighter malfunctions. There were an estimated 90 injuries and 10 deaths associated with these fires; property damage was estimated at almost 3 million dollars over the six-year period. Based on the most recent National Electronic Injury Surveillance System (NEISS) data covering 1997-2002, there were an estimated total of 3,015 emergency room-treated injuries that resulted from malfunctioning lighters. Most of these injuries involved thermal burns to the face, hands, and fingers. Over 96% of the injured were treated and released from hospital emergency rooms. For the same time period, CPSC has received 256 incident reports related to cigarette lighter malfunctions/failures; 65% of these cigarette lighter failures resulted in fires, leading to 3 deaths and 6 serious injuries.

From the incident data, it is not possible to determine whether lighters involved in the incidents conformed to ASTM F-400. However, in incidents where the manufacturer was identified, both domestic and imported lighters were involved. The available information on the level of conformance is conflicting. Based on information from the Lighter Association (petitioner) and two firms that are not members of the Association, it can be estimated that at least 75 percent of lighters in the U.S. market are purported to conform to ASTM F-400. However, the petitioner claims that 40 percent of the lighters

in the U.S. market do not meet the voluntary standard. The Safety Lighter Association International (SLAI), which represents importers of Chinese lighters, claims that as of September 2001, all lighters imported into the U.S. undergo testing to ensure conformance to ASTM F-400. CPSC staff has not monitored the conformance of domestic or imported lighters to the voluntary standard and thus cannot ascertain the extent to which lighters currently conform to the standard.

There are approximately 900 million cigarette lighters sold in the U.S. annually. The Lighter Association stated that its members' sales represent approximately 60 percent of the total U.S. lighter market.

The CPSC staff recommends that the Commission deny the petition to adopt ASTM F-400 as a mandatory consumer product standard under the CPSA. Staff believes that the available data do not support a rulemaking proceeding. The CPSC staff concludes that the risk of death or injury from lighter malfunctions is low in relation to the number of lighters on the market. In addition, the incident data do not provide sufficient information to determine whether the lighters involved in the incidents conformed to ASTM F-400.

While CPSC staff considers the available information insufficient to begin a rulemaking proceeding, the staff recognizes the merits of the voluntary standard, ASTM F-400, and believes that conformance to this standard could address potential injuries associated with lighter mechanical malfunctions. Therefore, the CPSC staff also recommends that the Commission direct the Office of Compliance to send a letter to all known lighter manufacturers and importers urging them to comply with ASTM F-400 as well as the mandatory standard for child resistance.

United States
CONSUMER PRODUCT SAFETY COMMISSION
Washington, D.C. 20207

MEMORANDUM MAY 27 2004

TO : The Commission
Todd A. Stevenson, Secretary

THROUGH: John Gibson Mullan, General Counsel JGM
Patricia Semple, Executive Director PS

FROM: Jacqueline Elder, Assistant Executive Director
Office of Hazard Identification and Reduction
Rohit Khanna, Project Manager, Lighter Petition RK
Directorate for Engineering Sciences

SUBJECT: CP 02-1, Petition to Adopt ASTM F-400-00 for Cigarette Lighters as a Consumer Product Safety Standard under the Consumer Product Safety Act

I. INTRODUCTION

The U.S. Consumer Product Safety Commission (CPSC) staff prepared this briefing package for the Commission in response to Petition CP 02-1. The package discusses the petition and supporting information, provides a staff analysis of relevant incident data, summarizes current standards for cigarette lighters, and discusses comments received in response to the Commission's January 17, 2002 notice in the Federal Register, as well as supplemental comments received on this petition.

II. PETITION CP 02-1

On November 27, 2001, the Lighter Association, Inc., the trade association representing the major U.S. manufacturers and distributors of cigarette lighters, requested that the Commission adopt the voluntary "Standard Consumer Safety Specification for Lighters" (ASTM F-400) as a mandatory consumer product safety standard under the Consumer Product Safety Act (CPSA). The requirements of ASTM F-400 address the risk of fire, death, and injury associated with mechanical malfunction or failure of the structural integrity of a lighter. The petitioner states that harmonizing the United States' standard with similar standards that are mandatory in Canada and Mexico will further the U.S. commitment under the North American Free Trade Agreement.

5/27/04

NOTE: This document has not been reviewed or accepted by the Commission.
Initial RK Date 5/27/04

The petitioner states that although most disposable lighters imported into the U.S. are child-resistant, many do not meet minimum safety standards followed by the U.S. lighter industry since adoption of ASTM F-400 in 1975. The petitioner estimates that over 400 million lighters are imported from China to the United States every year and that these lighters are rarely in conformance with ASTM F-400. The petitioner asserts that unreasonable risks of injury are being created by the Commission's "failure to enforce the provisions of the voluntary standard."

The petitioner states that international standards with similar requirements to ASTM F-400 have the force and effect of law in many countries throughout the world, including Canada and Mexico. The petitioner provided a copy of a 1999 report to the European Commission, Consumer Policy and Consumer Health Protection, showing that 19 models of Chinese lighters purchased in various countries failed to conform with the requirements of the equivalent European standard for cigarette lighters. The European Federation of Lighter Manufacturers sponsored the testing.

The petitioner provided an October 27, 2000, press release issued by Health Canada. The release notified consumers that Canadian Customs was refusing entry or seizing shipments of certain brands of Chinese lighters that presented fire, injury and burn hazards associated with lighter malfunctions. The petitioner stated that the Canadian warning resulted in millions of lighters that did not comply with ASTM F-400 being redirected to the U.S. market.

The petitioner provided copies of three CPSC press releases (November 1995, October 1999, and September 2000) announcing recalls of cigarette lighters in the United States found to present fire and burn hazards associated with lighter malfunction or structural integrity failures. Since the current mandatory standards for lighters do not address hazards presented by mechanical malfunction of lighters, these recalls were initiated under Section 15 of the CPSA.

On November 19, 2002, the petitioner provided supplemental information including a summary of test results showing that 11 Chinese lighter brands failed to comply with various provisions of ASTM F-400 and the equivalent European standard. The lighters were purchased in the United States in late 2001 and early 2002 and were tested by an independent testing laboratory. Using these test results as a basis, the petitioner stated that "there is still widespread noncompliance with ASTM F-400."

On August 26, 2003, the petitioner submitted supplemental comments that included a press release issued by Health Canada on June 23, 2003. The press release notified consumers that Health Canada inspectors had recently removed thousands of imported lighters that did not meet Canadian safety requirements.

III. PRODUCT AND MARKET INFORMATION (TAB A)

Product Description

As defined in the CPSA regulation (16 CFR, Part 1210) a cigarette lighter is a flame-producing product commonly used to light cigarettes, cigars, and pipes. The term "lighter" does not include matches or any other lighting device intended primarily to light materials other than smoking materials.

Cigarette Lighter Sales

The Directorate for Economic Analysis (EC) estimates the total annual sales of lighters to be about 900 million units. The Lighter Association has stated that its members' sales represent approximately 60 per cent of the total U.S. lighter market. On this basis, Lighter Association members account for approximately 540 million units sold in the U.S. each year. Census Bureau data on 2003 imports of lighters shows that 766 million units were imported into the U.S.[1] China accounted for 55 percent of the lighter imports to the U.S. (420 million units) in 2003. The retail price for disposable cigarette lighters generally ranges from $.50 to $1.25. Tab A describes the lighter market information in more detail.

IV. CURRENT STANDARDS FOR CIGARETTE LIGHTERS

Mandatory Standards in the U.S.

The mandatory requirements under the CPSA (16 CFR Part 1210) apply to disposable (non-refillable and inexpensive refillable) lighters and novelty cigarette lighters. The purpose of these requirements is to reduce injuries and deaths associated with children under the age of 5 starting fires with cigarette lighters. This standard covers all disposable and novelty lighters that are manufactured or imported after July 12, 1994 that have a Customs Valuation or ex-factory price under $2.25. This value is adjusted every 5 years, to the nearest $0.25, in accordance with the percentage changes in the monthly Wholesale Price Index from June 1993. Lighters subject to the requirements must be child-resistant as defined by a performance test using panels of children. Manufacturers and importers are required to certify that each lighter model meets the requirements prior to distribution in the U.S. After staff review of the test results and other required information, the CPSC Compliance staff provides a list of certified lighter models to U.S. Customs for use in identifying complying lighters as they enter the U.S.

Voluntary Standards in the U.S.

The Standard Consumer Safety Specification for Lighters (ASTM F-400) was published in 1975. The standard establishes requirements for all lighters to ensure a reasonable degree of safety for normal use or reasonably foreseeable misuse by users.

---

[1] Some Lighter Association members produce lighters in China, so they are considered imports.

ASTM F-400 includes requirements for a maximum flame height, proper flame extinction, maintaining structural integrity when exposed to hot or cold temperatures, maintaining structural integrity after a "drop" test, and requirements for internal pressure and fuel levels. ASTM F-400 also includes safety labeling requirements and instructions for proper use. Hazards associated with explosions are addressed in ASTM F-400 with requirements for pressure/volumetric displacement, flame control, and fuel leakage. The CPSC staff believes that ASTM F-400 appears to adequately address the risks associated with mechanical malfunctions of lighters.

International Standards

There are international standards for lighters with requirements similar to those in ASTM F-400. Published by the International Organization for Standardization (ISO), ISO 9994 Lighters, Safety Specifications, has been adopted in many European countries. Compliance with ISO 9994 is also mandatory in Australia and New Zealand. In North America, regulations in Canada (Hazardous Products Regulations, SOR/89-514, P.C. 1989-2151, amended by SOR/91-251, P.C. 1995-827) and in Mexico (NOM-090-SCFI-1994) are in place for cigarette lighters.

Standards Conformance & Recall Activity (TAB B)

The petitioner claims that the voluntary status of ASTM F-400 results in a lack of conformance by lighter importers, which poses an unreasonable risk to consumers. The petitioner submitted test data on 11 lighter models imported from China that were randomly purchased in late 2001 and early 2002. All of the lighters failed a number of the provisions of ASTM F-400. The petitioner also states that the European market has experienced similar problems. In 1999, the European Federation of Lighter Manufacturers conducted a market surveillance study of imported lighters from different European countries for conformance with ISO 9994. The report concludes that a significant percentage of imported lighters did not conform to ISO 9994.

The Safety Lighter Association International (SLAI), which represents lighter importers from China, claims that the China Inspection and Quarantine Bureau has initiated the legal procedure of inspecting all lighters exported from China as of September 2001. The SLAI states the inspection program addresses requirements identical to those in ASTM F-400 and Canada's Hazardous Goods (Lighter) Regulations. They refute the data submitted by the Association, saying that lighters tested may have been produced prior to the mandatory Chinese inspection program. The Association counters that of their members that produce in China, not one has been approached by any central testing agency.

In March 2002, CPSC staff traveled to eastern China to meet with officials involved with exportation and testing of cigarette lighters. The CPSC staff visited two of the five Hazardous Product Central Laboratory (HPCL) sites that perform testing on cigarette lighters destined for export. At each of the two HPCL sites, the CPSC staff observed the presence of equipment needed to conduct ASTM F-400 testing. The equipment

appeared to be fully capable of performing the required tests. The HPCL staff appeared to be competent and comfortable in performing lighter testing demonstrations for the CPSC staff. The CPSC staff believes that capable facilities and personnel are present in China to conduct ASTM F-400 testing, but we do not know the extent to which this program is enforced.

CPSC's Office of Compliance reports that since 1973, out of 53 recalls involving lighters, nine allegedly were due to mechanical defects and/or failures that are currently addressed by ASTM F-400[2]. The most recent of these recalls occurred in January 2001. The nine recalls involved 15,300,000 lighters, and the recalling firms reported 38 incidents involving recalled lighters. More information on recalls is provided in Tab B.

According to information from the petitioner, the Lighter Association members account for at least 60 percent (540 million units) of the U.S. lighter market. Two firms that are not members of the Lighter Association, Polycity Enterprises Limited (a Chinese manufacturer) and New York Lighter (a U.S. importer) stated that their lighters conform to ASTM F-400. These two firms account for an additional 125 million units of U.S. lighter sales. Based on these submissions alone, it can be estimated that at least 75 percent (665 million units) of lighters in the U.S. market are purported to conform to the requirements of ASTM F-400.

The CPSC staff has not monitored conformance of domestic or imported lighters to the voluntary standard. At this time we do not know the extent to which firms are producing or distributing lighters that meet the requirements of ASTM F-400. In order to obtain accurate information on lighter conformance, the staff would need to conduct an in-depth study comprising a statistically valid sampling of lighters and a comprehensive test program in order to determine conformance to the ASTM F-400 requirements. More information on recalls is provided in Tab B.

V. INCIDENT DATA (TAB C)

The staff searched the following sources for incidents involving malfunctions of cigarette lighters:

- National Fire Incident Reporting System (NFIRS)
- National Electronic Injury Surveillance System (NEISS)
- Death Certificates file (DTHS)
- Injury or Potential Injury Incident file (IPII)
- In-Depth Investigation file (INDP).

Appendix 1 of Tab C describes the data sources in more detail and the selection criteria used for the searches. The staff analyzed the most recent years of available data for each database. The analysis includes the majority of the data submitted by the petitioner.

[2] The remaining recalls were related to compliance with mandatory child resistance requirements.

National Fire Incident Reporting System (NFIRS) 1994 – 1999

U.S. fire departments attended an estimated 330 residential structure fires caused by cigarette lighter malfunctions from 1994 to 1999. These fires resulted in an estimated 90 injuries, 10 deaths, and $2.8 million in property damage. Although based on a small number of incidents, the average annual fire estimates associated with lighter malfunctions for this period are 60 fires, 20 injuries, 0[3] deaths, and 0.5 million dollars in property loss.

National Electronic Injury Surveillance System (NEISS) 1997 – 2002

NEISS is a statistical sampling of U.S. hospital emergency rooms that is designed to capture injuries associated with consumer products, while NFIRS is a voluntary fire department reporting system that tracks fire incidents in the U.S. Since injures related to cigarette lighter mechanical malfunctions are often not associated with a fire reportable to NFIRS, the NEISS provides a better estimate of these injuries than does NFIRS. Based on data from NEISS, there were an estimated 3,015 individuals who visited U.S. emergency departments for injuries associated with cigarette lighter malfunction over the six-year period, 1997-2002. The estimated number of injuries ranged from a low of 345 in 2002 to a high of 724 in 2000.

Ninety-six percent of the injuries reported through NEISS were treated and released. The majority (about 82 percent) of the injuries were thermal burns. The face, hand, or fingers accounted for 80 percent of the injured body parts.

Seventy-one percent of those injured were males and 29 percent were females. Approximately 80 percent of those injured were between 15 and 64 years of age.

Death Certificates file (DTHS) 1997 – 2002

The DTHS file contains information from death certificates purchased by CPSC from all 50 states, Washington, D.C., and New York City. For the period January 1, 1997, through December 31, 2002, one death was identified from the DTHS file that may have involved a cigarette lighter malfunction. On March 10, 2001, a 76-year old woman died from 3rd degree burns to over 90% of her body. The report from the county sheriff's office concluded that the victim either accidentally ignited her clothing with the lighter while smoking or the lighter sprayed fuel on her while she was lighting her cigarette.

Injury or Potential Injury Incident file (IPII) & In-Depth Investigation file (INDP) 1997- 2002

A total of 256 incidents related to cigarette lighter malfunctions were identified from

[3] Before rounding to the nearest 5, the annual average number of deaths was 2.0.

January 1, 1997, through December 31, 2002 from sources including newspaper clippings, consumer complaints, medical examiners' reports, and CPSC in-depth investigations. While not a statistical sample of all incidents that occurred during this time period, these reports provide useful detail about the incidents.

Distribution of the Type of Cigarette Lighter Malfunction

	HAZARDS			
TYPE OF MALFUNCTION	Fires	Explosions	Other	TOTAL
Pressure / volumetric displacement	34	41	6	81
Flame control / height adjustment	36	1	1	38
Refilling: fuel leakage / gas escape	28	1	9	38
Failure to extinguish	29	0	0	29
Sparks / flaring / self-ignition	21	0	1	22
Failure to withstand extreme temperature	6	13	0	19
"Drop test" failure	1	11	1	13
"Burning time" failure	8	2	2	12
Other / unknown	3	0	1	4
TOTAL	166	69	21	256

Source: IPII and INDP, 01/01/97 – 12/31/02

One hundred three of the 256 incidents resulted in injuries to 107 individuals. Three of the 107 injured individuals died, six were hospitalized with serious injuries, and the majority (88) were treated and released. The condition of the remaining individuals was not reported. The deaths reported here were in addition to the deaths estimated through the NFIRS system. Sex was reported for 100 of the injured; 51 of them were males and 49 were females. Where age was reported, almost 66 percent of the individuals were 15 through 64 years of age. There were no injuries to children under 5.

As shown in the table above, the most frequent type of malfunction identified in the incidents is explosion due to pressure or volumetric displacement. Lighter explosions typically occur when the fuel chamber ruptures due to failure to withstand the internal vapor pressure. To reduce the likelihood of explosion, the ASTM F-400 standard requires that the liquid portion of the fuel not exceed 85 percent of the volumetric capacity of the fuel chamber. Malfunctions due to pressure or volumetric displacement led to all three deaths reported in the IPII and INDP incidents. Some other failures that resulted in serious injury included fuel leakage resulting in ignition and flaring of the lighter. The incidents that resulted in deaths or serious injuries are summarized in appendix 3 of Tab C.

Summary of Incident Data

Based on the most recent data available from NFIRS, 330 (an annual average of about 60) residential structural fires were estimated for the period 1994 – 1999 that were

caused by faulty cigarette lighters. There were an estimated 90 injuries and 10 deaths associated with these fires and the property damage was estimated at almost 3 million dollars over the six-year period. Based on the most recent years of available NEISS data, 1997-2002, an estimated 3,015 injuries (an annual average of about 503) that resulted from malfunctioning cigarette lighters, mostly thermal burns to the face, hands, and fingers, were treated in hospital emergency rooms. Over 96% of the injured were treated and released. For the same period, 256 incident reports related to cigarette lighter failures were received; 65% of these cigarette lighter failures resulted in fires, leading to 3 deaths and 6 serious injuries. Of the types of mechanical failures identified in these reports, pressure and volumetric displacement were the most common.

The incident data does not provide sufficient information to determine whether or not any of the lighters involved in the incidents conformed to ASTM F-400. Lighters from both Lighter Association members and nonmembers comprised the top four manufacturers cited most frequently in these incidents.

VI. HAZARD COSTS AND POTENTIAL BENEFITS (TAB A)

For the approximately 900 million lighters purchased by consumers during a year, the average societal costs due to deaths, injuries, and property losses from mechanical malfunctions of lighters are about $38 million. This estimate is based on an annual average of 2 deaths, 990 injuries and $500,000 in property losses estimated from available data, as described in Tab A. Therefore, a mandatory rule based on ASTM F-400 may have a maximum potential benefit of about $.04 per lighter ($38 million / 900 million lighters). If, however, lighters currently purchased by consumers are less likely to malfunction than the lighters in use during the period covered by the hazard data, the potential benefits would be smaller. For example, this could be the case if more lighters conform to the voluntary standard because of the Chinese inspection program adopted in 2001.

For the approximately 900 million lighters purchased by consumers annually, the estimated risk of death from lighter malfunctions is 2.2 per billion lighters (2 deaths / 900 million lighters). This is approximately 1 percent of the overall risk of death from unintentional lighter fires, which is estimated to be 190 deaths per billion lighters annually. The estimated risk of injury associated with lighter malfunctions is about 1.1 per million lighters (990 injuries / 900 million lighters). This is about 13 percent of the overall risk of medically-attended injury associated with lighters, which is estimated to be 8.7 per million.

With currently available information, the staff cannot make a reliable estimate of the costs to consumers from a mandatory rule based on ASTM F-400. The petitioner stated in supplemental comments that the "cost of complying with ASTM F-400 is a matter of a penny or two per lighter, at most, and it is a cost which all reputable lighter manufacturers are already incurring." Staff believes that this is a reasonable statement; however, those who are not currently conforming to ASTM F-400 would be expected to incur additional costs. Based on the available information, both the likely benefits and

likely costs of a mandatory standard based on ASTM F-400 would be small.

VII. FEDERAL REGISTER NOTICE

The Commission published a Federal Register notice on January 17, 2002 requesting comments on the petition. The comment period closed on March 18, 2002. After the comment period, additional comments were received and are included in the discussion. Copies of all comments are available from the Office of the Secretary. The Commission received 16 comments on the petition. Fourteen comments supported the petition, one comment was neutral, and one comment opposed the petition.

The following parties supported the petition:

- Swedish Match, manufacturer and distributor of Cricket® lighters
- New York Lighter Company, Inc., one of the largest importers and distributors of disposable lighters made in China
- Lighter Assoction, Inc.
- Polycity Enterprises, Ltc., a Hong Kong exporter of cigarette lighters made in China
- Michael T. Bogumill, Product Safety Consulting, former CPSC Compliance Officer responsible for overseeing CPSC's enforcement of the requirements of the Safety Standard for Cigarette Lighters
- BIC Corporation, the leading manufacturer and distributor of disposable lighters in North America
- TNT Marketing, a lighter distributor
- Ace Product USA, Inc., a lighter distributor
- Wholesale Novelty, Inc., a lighter distributor
- Hudson Universal LTC, a lighter distributor
- Four Seasons Distributors, a lighter distributor
- Safety Lighter Association International, the trade association representing importers of lighters manufactured in China

BIC Corporation provided comments similar to those of many of the parties supporting the petition. BIC provided a chart of recalls announced by the CPSC and Health Canada since 1995. The chart provided information on recalls of 76 lighter brands. About 49 of the 76 recalls were due to failure to conform to ASTM F-400 related requirements. BIC stated "The numbers summarized in the attached chart do not represent the rare and unfortunate oversight which necessitates a recall. Rather, the numbers indicate an apparent blatant disregard of the voluntary standards governing the manufacture and performance of cigarette lighters. The ASTM standard for cigarette lighters (ASTM F-400-00) has the force and effect of law in Canada and Mexico. The evidence is compelling that unreasonable risks of injury are being created by failure to enforce the existing voluntary standard in the United States, and that the United States should join Canada and Mexico by promulgating a mandatory standard."

Counsel to New York Lighter Company, Inc. wrote two letters in response to the Federal Register notice. The first letter was written to dispute some of the claims made by the

petitioner. New York Lighter believes the claim that most imported lighters do not meet ASTM F-400 is an overstatement. The commenter notes that some lighter brands were seized because of procedural reasons, and not due to failure to meet ASTM specifications. The commenter further notes that some of the incident reports appended in the petition included lighters made by domestic manufacturers. New York Lighter stresses that its suppliers conform to the ASTM specification and that it routinely has its lighters tested to ensure conformance. The letter concludes by stating "The CPSC should make the ASTM specification mandatory to do so is in the best interest of U.S. consumers." The second letter re-affirms New York Lighter's support to require ASTM F-400 as a mandatory standard. They state "New York Lighter has noticed in the U.S. marketplace a substantial volume of cigarette lighters do not comply. New York Lighter believes that these non-complying lighters are responsible for a disproportionately large share of injury to consumers, and create a harmful image for everyone in the lighter business."

Counsel to Polycity Enterprises, Ltd., one of the largest exporters of cigarette lighters from China writes in support of adoption of the ASTM voluntary standard as a mandatory consumer product safety standard. This letter states "Polycity tests lighters it sells to the United States according to the ASTM Specification, and expects U.S. distributors to do the same. Polycity regards safety as good business." The letter concludes with "Such a change in safety requirements would be good for consumers and for the responsible industry."

According to the Safety Lighter Association International (SLAI), the trade association for mainly Chinese importers, lighters are tested prior to export to ensure that they comply with ASTM F-400 and Canada's Hazardous Products Regulations. The SLAI requests that testing conducted in China be accepted as verification of compliance if the Commission promulgates additional mandatory requirements for lighters.

The following comment opposed the petition:

Zreative Products, Inc. and five additional importers[4] of Chinese lighters submitted a joint letter to oppose the petitioner's request to adopt ASTM F-400 as a consumer product safety standard. They state that due to the success of the mandatory standard for child resistant lighters, another safety standard for lighters is unnecessary. Their letter also states that the ASTM F-400 standard is a "performance" standard to enhance the quality of cigarette lighters, not for the purpose of child safety. Another point made by their letter is that the resulting costs associated with ASTM F-400 testing would be high.

The following comment neither supported nor opposed the petition:

The Hazardous Products Central Laboratory (HPCL) had a neutral position on the petition. HPCL discussed the inspection program for all exported cigarette lighters

[4] Gibson Enterprises, Golden Star Group, A.S.G Enterprise, TXI Enterprise, L.A. Lighter.

implemented by the Chinese government on June 1, 2001 (SN 0761-1999, Rules for Inspection of Export Dangerous Goods). HPCL states that they have represented the Chinese government at various international meetings, and they are the only laboratory assigned by the Chinese government to conduct testing of lighters for export. HPCL discusses visits to their laboratory by representatives from both Health Canada and the CPSC. HPCL states that the Canadian Government accepts their "certificate of inspection" as documentation that lighters meet the Canadian lighter requirements[5].

VIII. DISCUSSION OF COMMENTS

Most of the parties submitting comments state that adopting ASTM F-400 as a mandatory standard is in the public interest and would benefit the reputable lighter industry. Many parties stated that the U.S. should follow Canada and Mexico and adopt ASTM F-400 as a mandatory standard.

There is conflicting information concerning the conformance of imported lighters to ASTM F-400. The petitioner claims that imported lighters are rarely in compliance with ASTM F-400. The SLAI and other importers claim that all lighters that leave China now undergo testing by the Chinese government. The CPSC staff has not conducted a conformance-monitoring program for lighters and we do not know the level of conformance by the industry at this time.

Five parties submitted a joint statement opposing the petition. They stated that the petition is unnecessary due to the success of the CPSC mandatory rule on child resistant lighters and that if another mandatory rule is adopted, consumers would have to pay "a lot more" for lighters. This petition addresses the risk of mechanical malfunction of lighters and has no relation to the mandatory rule addressing child-resistance of lighters. The statement regarding a significant increased cost to consumers is in conflict with the information provided by the petitioner and with the staff belief that costs associated with conformance with ASTM F-400 would be small.

IX. OPTIONS

A. Grant the petition

The Commission could grant the petition if it determines that available information indicates that cigarette lighters may present an unreasonable risk of death or personal injury as a result of mechanical malfunction or structural integrity failure.

If the Commission grants the petition, the Office of the General Counsel would prepare a draft advance notice of proposed rulemaking (ANPR) for consideration. Publication of an ANPR in the Federal Register would initiate a rulemaking proceeding for a mandatory consumer product safety standard.

---

[5] According to Health Canada's *Hazardous Products (Lighters) Regulations Enforcement Policy*, Health Canada only accepts test results from its own Product Safety Laboratory.

B. Deny the petition

The Commission could deny the petition if the available information is not sufficient to indicate that cigarette lighters may present an unreasonable risk of personal injury or death.

C. Defer a decision on the petition

The Commission could defer a decision on the petition if it determines that there is insufficient information to make a decision, but that the necessary information could be obtained in the near future.

X. CONCLUSIONS

Cigarette lighters can present a risk of death or personal injury as a result of malfunction or structural integrity failure. However, the hazard data indicate that these injuries are relatively infrequent. The risk of death or injury from a lighter malfunction is low in relation to the number of lighters on the market. For the approximately 900 million lighters purchased by consumers in a year, the estimated risk of death from lighter malfunction is about 2.2 deaths per billion lighters. The estimated risk of injury is about 1.1 injuries per million lighters. In addition, the incident data do not provide sufficient information to determine whether or not the lighters involved in these incidents conform to ASTM F-400.

Based on information provided by the petitioner and other sources, it can be estimated that at least 75 percent of the lighters sold in the U.S. are purported to conform to ASTM F-400. It is possible that the level of conformance is higher as a result of the inspection program for exported lighters implemented by the Chinese Government in September 2001. Verified information on conformance could be obtained by CPSC staff through a voluntary standards conformance monitoring program. Such a program would require a statistical study of lighter models and a comprehensive test program to determine conformance to ASTM F-400.

The CPSC staff recognizes the merits of the voluntary standard, ASTM F-400, and believes that conformance to this standard could address potential injuries associated with lighter mechanical malfunctions. Further, the Office of Compliance will continue to pursue recalls, where appropriate, of lighters that present a significant hazard due to excessive flame height, improper flame extinction, failure of structural integrity, etc.

XI. STAFF RECOMMENDATION

The staff recommends that the Commission deny the petition to adopt ASTM F-400 as a mandatory consumer product safety standard under the CPSA. Staff believes that the available data do not support a rulemaking proceeding, based primarily on the low risk of death or injury from lighter malfunctions, and uncertainty as to the level of voluntary standard conformance among lighters involved in the incidents. The staff

also recommends that the Commission direct the Office of Compliance to send a letter to all known lighter manufacturers and importers urging them to comply with both mandatory and voluntary standards for cigarette lighters.

TAB A

United States
CONSUMER PRODUCT SAFETY COMMISSION
Washington, D.C. 20207

Memorandum

DATE: March 10, 2004

TO : Rohit Khanna, ESFS, Project Manager, Petition CP 02-1

Through : Gregory B. Rodgers, AED, EC GBR

FROM : Charles L. Smith, EC CLS

SUBJECT : Lighter Petition (Petition CP 02-1): Economic Considerations

Background

On November 27, 2001, The Lighter Association filed a petition with the Consumer Product Safety Commission (CPSC) requesting that the provisions of a voluntary lighter standard, ASTM F400-00, be adopted as a mandatory standard. The petitioner asserts that the provisions of the ASTM standard would address safety hazards related to lighters that malfunction or lighters with inadequate structural integrity.[1] Disposable lighters have been subject to a mandatory CPSC rule addressing child-resistance since 1994. The association claims that a mandatory rule that includes the provisions of ASTM 400-00 is necessary because many lighters are imported from China that are not in conformance with the voluntary standard.

Market Information

The Lighter Association is comprised of major manufacturers of lighters marketed in the U.S., including BIC, Calico, Colibri, Djeep, Scripto-Tokai, Swedish Match (Cricket), Ronson, and Zippo. Although association members reportedly account for the majority of lighters sold in the U.S., many other firms are also active in this market. As of January 24, 2003, ninety manufacturers and importers intending to market disposable lighters in the U.S. had filed reports with the CPSC that are required under the Safety Standard for Cigarette Lighters.

Most lighters purchased by U.S. consumers are imported. U.S. Census Bureau data on 2003 imports of non-refillable and refillable pocket lighters (most of which would be within

[1] ASTM F400-00 includes tests or requirements relating to maximum attainable flame height; absence of spitting, sputtering, or flaring; safe extinguishment; performance after lighters are dropped onto a hard surface; performance after a burning time of 5 seconds; capability of lighters to withstand a temperature of 55 degrees Celsius for four hours; that the liquid portion of the fuel in gas lighters shipped with fuel shall not exceed 85% of the volumetric capacity of the fuel chamber; capability of gas lighters to withstand an internal pressure of two times the vapor pressure occurring at 55 degrees Celsius of the fuel recommended by the manufacturer; that refillable fluid lighters having a sealed fuel reservoir shall be free of fuel leakage from both the sealed reservoir and the sealing closure; and that the refilling valve in a pressurized fuel reservoir lighter shall be secure enough so as not to allow an escape of gas exceeding 15 mg/minute.

the scope of the CPSC lighter rule addressing child-resistance) suggest that up to 766 million lighters imported annually could be subject to the standard requested by the petition. Data on lighter imports may be found in Tables 1 and 2. The leading country of origin for imported lighters is China, which accounted for about 55 percent of gas-fueled pocket lighters imported in 2003. Domestic lighter production could bring total annual U.S. consumption to about 900 million units.

The Lighter Association stated that its members account for at least 60 percent of the total lighter market in the U.S. On this basis, the Directorate for Economic Analysis estimates that Lighter Association members may account for 540 million or more lighters sold in the U.S. annually. All of the lighters marketed by members of the Lighter Association reportedly are manufactured with the intention of conforming with ASTM F400-00.[2]

Two firms that are not members of the Lighter Association, Polycity Enterprise Limited (a Chinese manufacturer) and New York Lighter (a U.S. importer), also submitted comments in support of the petition to mandate the provisions of ASTM F400-00. New York Lighter reportedly markets most of Polycity's exports to the U.S. Based on information provided by counsel for both of these firms, they account for about 125 million lighters imported from China annually which meet the requirements of the voluntary standard. If lighters sold in the U.S. by these firms and by members of the Lighter Association conform to the ASTM standard, the total number of conforming lighters marketed annually in the U.S. could be greater than 665 million units, or about 75 percent of the market.

To the extent that additional manufacturers in China and other countries conform to ASTM F400-00 or the nearly identical international standard, ISO 9994, this percentage would be higher. A factor that should increase the overall level of conformance with the voluntary standards is the mandatory inspection program for exported lighters implemented by the Chinese government in September 2001. That program reportedly requires lighters to conform to the provisions of the voluntary standards if they are to be exported from China. However, the CPSC staff has not verified the extent to which lighters entering the U.S. market from China or other sources conform to the voluntary standard.

Number of Lighters in Use

A 1990 survey of households sponsored by the CPSC found that about 29 million households owned one or more working lighters. This was about 31 percent of the approximately 93 million U.S. households in 1990. The survey also found that lighter-owning households had an average of about 3.5 lighters. Therefore, approximately 104 million were owned. More recent survey data are not available. Nearly all lighter use by those surveyed was for lighting smoking materials, so consumer demand is largely dependent on consumption of cigarettes and the prevalence of smoking among the population.

The proportion of U.S. adults who smoked cigarettes fell from about 25.3 percent in 1990 to 22.7 percent in 2001, a decline of about 10 percent. However, since the U.S. adult

[2] David H. Baker, General Counsel for the Lighter Association, in a telephone conversation with Charles Smith, Directorate for Economic Analysis, CPSC, February 6, 2004.

population increased by nearly 11 percent from 1990 to 2000, the number of smokers has remained nearly constant over this period. This might indicate that the number of lighters used by smokers is about the same as estimated for 1990. However, since lighter sales apparently have increased in recent years, a greater percentage of smokers might be using lighters rather than matches, and perhaps 110 to 125 million lighters are now in use.

Hazard Costs and Potential Benefits of a Mandatory Rule

The Directorate for Epidemiology's Division of Hazard Analysis presented hazard data involving likely cigarette lighter malfunctions.[3] NFIRS and NFPA data show an average of about 60 fires, 20 injuries, and $500,000 in property losses annually from cigarette lighter malfunctions from 1994 through 1999. The average number of deaths from lighter malfunctions was 2.0 per year during this period. NEISS data involving cigarette lighter malfunctions show that there were an estimated 3,015 injuries treated in hospital emergency rooms from 1997 through 2002, a mean of 503 injuries annually over that period. Over 96 percent of these estimated injuries were treated and released, according to the Division of Hazard Analysis. According to estimates made with the Commission's Injury Cost Model, other medically-treated injuries (other than those treated in hospital emergency rooms) bring the total annual number of injuries involving lighter malfunctions to about 990 per year during the 1997 – 2002 time period. The Directorate for Economic Analysis estimates that the value of annual hazard costs from deaths, injuries and property losses that might be related to lighter malfunctions could total about $38 million.[4] These costs might be viewed as the maximum potential benefits of a mandatory rule, if all of the incidents could be prevented.

Since the average useful life of a lighter may be less than two months, it is appropriate to compare risks and societal costs in a year to lighters purchased in a year, rather than to estimated numbers of lighters in use at a given time. For the approximately 900 million lighters purchased by consumers in a year, the estimated risk of death from lighter malfunctions is 2.2 per billion lighters (2 deaths / 900 million lighters). This is roughly 1 percent of the overall risk of death from unintentional lighter fires, which is estimated to be about 190 deaths per billion lighters annually.[5] The estimated risk of injury is about 1.1 per million lighters (990 injuries / 900 million lighters). This accounts for about 13 percent of the overall risk of medically-attended injury associated with lighters, which is estimated to be about 8.7 per million lighters.[6]

---

[3] Risana Chowdhury, Division of Hazard Analysis, Directorate for Epidemiology, CPSC. Memorandum to Rohit Khanna, CPSC Project Manager for the Lighter Petition, January 13, 2004.

[4] Estimated hazard costs are based on a statistical value of $5 million for each death (with an average annual total of $10 million), consistent with the general range of the statistical value of life published in the literature, which generally falls in the $3 million to $7 million range; average injury costs of about $27,700 are assigned to injuries estimated from NEISS data, including those treated in emergency departments and other medically-attended injuries (with an estimated average annual total of $27.4 million); and average annual property losses (from NFIRS data) total $500,000.

[5] The overall estimated risk of about 190 lighter fire deaths per billion lighters is based on the annual average of 170 deaths during the years 1994 through 1999, divided by the estimated 900 million lighters purchased in a year. Sources for lighter fire death estimates were Linda Smith and Jean Mah, Division of Hazard Analysis, Directorate for Epidemiology, CPSC. *Revised Residential Fire Loss Estimates, 1980-1998*, July 25, 2002; also, David Miller, Linda Smith and Michael Greene, Division of Hazard Analysis, Directorate for Epidemiology, CPSC. *1999 Residential Fire Loss Estimates*, November, 2003.

[6] Based on estimates provided by the CPSC's Injury Cost Model, the annual number of medically-treated injuries involving lighters averaged 7,869 for the period 1997 – 2002.

The average societal costs (associated with deaths, injuries and property losses) from incidents involving lighter malfunction are about $.04 per lighter ($38 million / 900 million lighters).[7] If lighters that do not meet the requirements of the voluntary standard present greater safety risks, the expected societal costs of nonconforming lighters (and maximum potential benefits of a rule) would be greater than $.04. The actual benefits that would result from a mandatory rule would be limited by the effectiveness of the standard's provisions at reducing the occurrence of lighter malfunctions.

Potential Costs of a Mandatory Rule

At this time the costs of a rule which would mandate the performance criteria of the ASTM standard are uncertain. Although the government of China reportedly implemented a mandatory inspection program for exported lighters in September 2001, the actual level of conformance with the voluntary standards for lighters exported from China is not known. Further, it is possible that lighters sold to U.S. consumers, from China and other sources, could conform to some provisions of the ASTM standard, but not others. Thus, the costs of bringing different lighter models into conformance could vary.

Given these circumstances, at this time the staff cannot make a reliable estimate of the costs of a mandatory rule that would require compliance with provisions similar to those of ASTM F400-00. Although Zreative Products (a lighter importer) commented that the compliance costs would result in substantial price increases for consumers, the Lighter Association replied in supplemental comments that the "cost of complying with ASTM F400-00 is a matter of a penny or two a lighter, at most...." This statement appears reasonable given information that the average Customs Value of non-refillable lighters imported from China in 2003 was under $.05 (See Table 1).

Disposable lighters generally range in price from about $.50 to $1.25 per unit at retail. Some increase in retail prices of lighters that currently do not conform to all provisions of the ASTM standard (accounting for perhaps less than 25 percent of the market) might be expected.

Summary

Information on the extent to which lighters currently sold in the U.S. are in conformance with some or all provisions of the ASTM F400 standard is not available. Also, information with which to judge the effectiveness of specific standard provisions in reducing hazards associated with lighter malfunctions is lacking. The information that is available to the staff indicates that both the likely benefits and the likely costs to consumers of a rule that includes the provisions of ASTM F400-00 would be small.

[7] As noted above, the societal cost estimates are based on hazard data averaged over time. If, however, lighters currently purchased by consumers are less likely to malfunction than lighters in use during the period covered by the hazard data, potential benefits would be smaller. For example, this could be the case if more lighters conform to the voluntary standards because of the Chinese inspection program adopted in 2001.

Table 1.
U.S. Imports of Gas-Fueled, Non-Refillable Pocket Lighters, 2003
(Harmonized Tariff Schedule Code 9613.10.0000)

	2003		
	Quantity	% of Total	Customs Value
WORLD TOTAL	713,086,445	100.0%	$59,250,000
China	367,593,648	51.5%	$15,490,000
Thailand	107,249,951	15.0%	$6,964,000
France	105,364,368	14.8%	$21,211,000
Hong Kong	55,630,008	7.8%	$1,918,000
Mexico	45,904,779	6.4%	$6,856,000
Philippines	12,375,275	1.7%	$2,968,000
Spain	7,731,533	1.1%	$2,447,000
Vietnam	3,795,200	0.5%	$124,000
Netherlands	2,140,206	0.3%	$519,000
India	1,977,500	0.3%	$424,000
Taiwan	1,800,500	0.3%	$54,000
Others	2,070,196	0.3%	$3,725,000

Source: Foreign Trade Division, U.S. Census Bureau.

Table 2.
U.S. Imports of Gas-Fueled, Refillable Pocket Lighters, 2003
(Harmonized Tariff Schedule Code 9613.20.0000)

	2003		
	Quantity	% of Total	Customs Value
WORLD TOTAL	53,369,194	100.0%	$32,532,000
China	52,532,794	98.4%	$25,630,000
Korea, South	484,116	0.9%	$3,303,000
Hong Kong	157,213	0.3%	$315,000
Japan	84,518	0.2%	$1,254,000
Austria	56,752	0.1%	$127,000
Taiwan	25,952	0.0%	$73,000
France	19,437	0.0%	$1,635,000
Others	8,412	0.0%	$196,000

Source: Foreign Trade Division, U.S. Census Bureau.

TAB B

UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, DC 20207

Memorandum

Date: February 26, 2004

TO : Rohit Khanna; Project Manager, Petition CP 02-1

THROUGH: Alan Schoem; Director, EXC

FROM : Joe Vogel, Compliance Officer, CRC/FER

SUBJECT : CP 02-1, Petition to Adopt ASTM F400-00 for Cigarette Lighters as a Consumer Product Safety Standard under the Consumer Product Safety Act.

Office of Compliance staff reviewed recalls of cigarette lighters ("lighters") conducted between January 1973 and October 2003. Of those approximately 55 recalls, nine were based on allegations of incidents and injuries, or potential injuries, due to defects and/or failures covered by the voluntary standard for cigarette lighters, ASTM F400-00. The allegations included high flames, failure to extinguish, flaring, gas leaks and explosions. The recalling firms reported a total of 38 incidents involving the recalled lighters. Reported injuries included burns, ranging from "minor" to second degree, and singed hair; property damage was also reported. There were no reports of grievous injuries or deaths associated with the recalled products.

The 38 alleged incidents - out of more than 15,300,000 lighters involved in the nine recalls identified above - occurred sporadically over the past approximately 30 years. There were few incidents resulting in recalls from January 1973 through September 1994 (7), two spikes in consumer complaints in the period October 1994 through December 1995 (27), and few incidents between January 1999 and December 2000 (4). There have been no recalls for issues addressed by ASTM F400-00 since approximately January 2001, although we were not actively looking for violations that might have resulted in recalls. **Figure 1** illustrates the number of incidents involving recalled lighters, which were allegedly due to problems addressed by ASTM F400-00.

The recalled lighters were manufactured in China, France, Holland and Korea, however, the country of origin could not be easily determined for four of the nine recalls. **Figure 2** shows the percentage of recalls per country of origin, where known.

The CPSC has not monitored conformance to the voluntary standard for cigarette lighters. Therefore, based on our evaluation of the lighter recalls conducted over the years, we do not know at this time whether lighter manufacturers, in general, are adhering to the voluntary lighter standard. We also do not know if the firms are producing, importing and/or distributing significant numbers of lighters with potential hazards addressed by the voluntary standard. Whether lighters that do not conform to the voluntary standard are defective and present a substantial product hazard would depend on the nature of the violation and risk of injury presented by the violation.

FIGURE 1

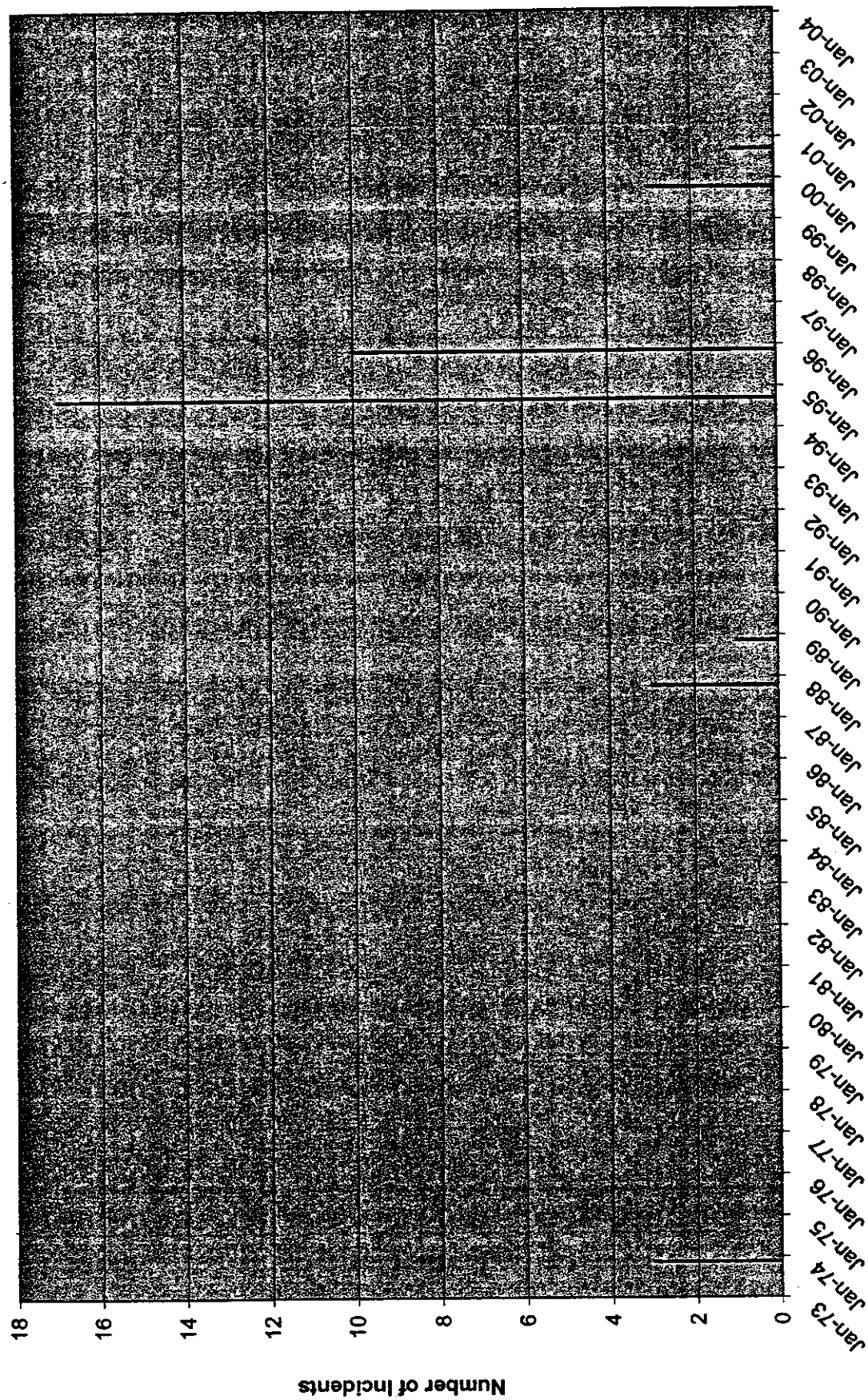
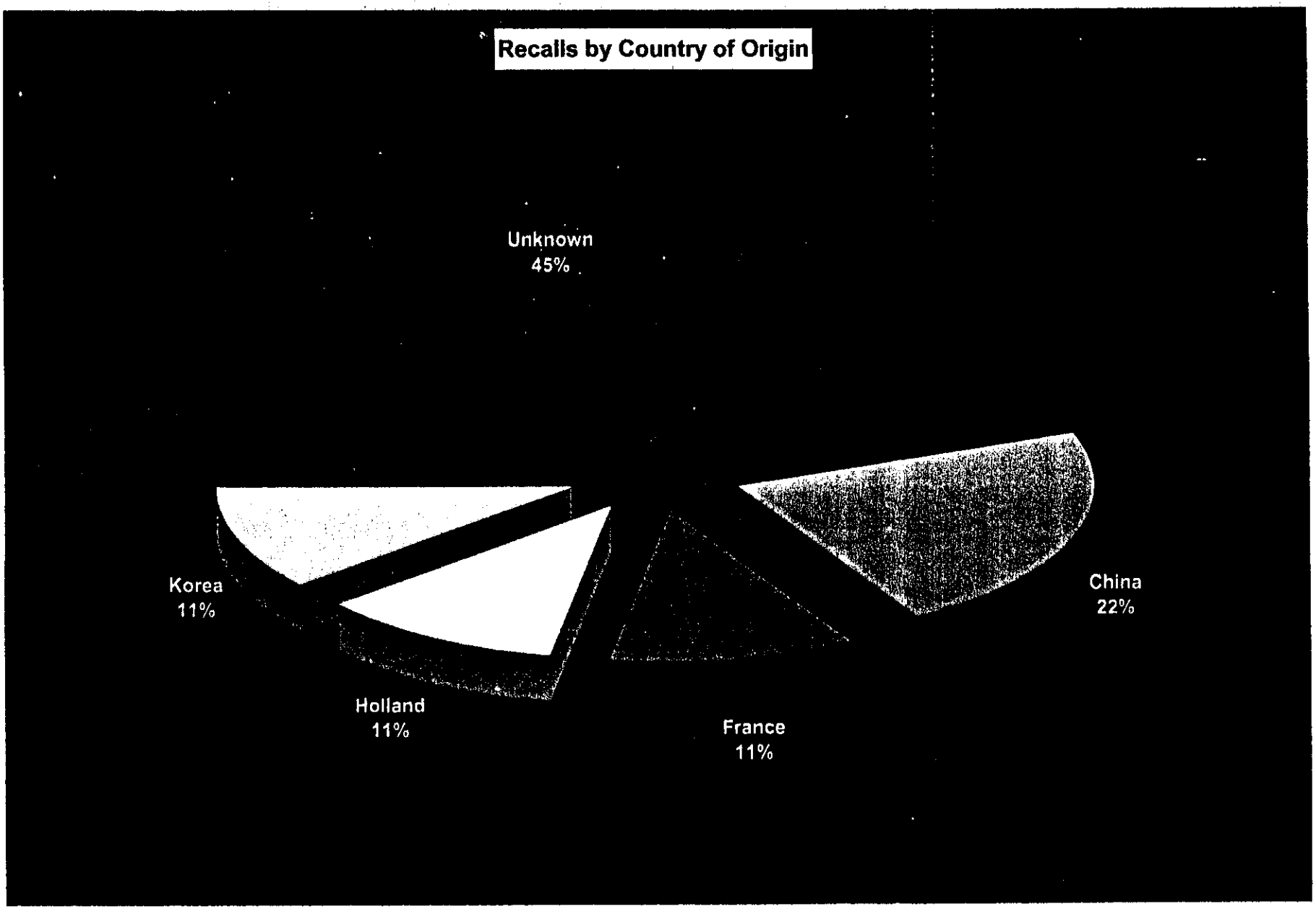

Reported Incidents Involving Lighters Recalled for Issues Addressed in ASTM F400
Number of Incidents
0
2
4
6
8
10
12
14
16
18
Jan-73
Jan-74
Jan-75
Jan-76
Jan-77
Jan-78
Jan-79
Jan-80
Jan-81
Jan-82
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04

FIGURE 2


Recalls by Country of Origin
Unknown
45%
Korea
11%
Holland
11%
France
11%
China
22%

TAB C

UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, DC 20207

Memorandum

Date: January 13, 2004

TO : Rohit Khanna
Project Manager, Cigarette Lighter Petition
Directorate for Engineering Sciences

THROUGH: Susan W. Ahmed, Ph.D.
Associate Executive Director
Directorate for Epidemiology

Russell H. Roegner, Ph.D.
Division Director
Division of Hazard Analysis

FROM : Risana Chowdhury, M.S., M.S.E.
Division of Hazard Analysis

SUBJECT : Hazards Associated with Cigarette Lighter Malfunctions

The Lighter Association, Inc. filed a petition requesting that ASTM F400-00, Safety Standard for Lighters, be adopted as a mandatory consumer product safety standard. This stemmed from the Association's concern about the presence of lighters in the market that fail to meet the safety requirements in this standard. In order to determine whether existing data support the need for a mandatory standard, the staff at the Consumer Product Safety Commission (CPSC) carried out a data search. This memorandum summarizes the findings of that effort.

Methodology

The focus of this search was on mechanical failures of disposable cigarette lighters, reported during the most recent years of available data. Five databases were searched for identification of these incidents: the National Fire Incident Reporting System (NFIRS), the National Electronic Injury Surveillance System (NEISS), the Death Certificates file (DTHS), the Injury or Potential Injury Incident file (IPII), and the In-Depth Investigation file (INDP). Appendix 1 details information about these data sources and the selection criteria used for this data search.

The risks posed by malfunctions of cigarette lighters primarily include fire, laceration, and burn hazards. In their petition, the Lighter Association described eight common types of mechanical failures in lighters that were of concern. As defined by the ASTM standard, these were:

- Flame control or height adjustment problem
- Sparks or flaring
- Pressure or volumetric displacement concerns

- Failure to extinguish
- "Drop test" failure, which means dropping a lighter onto a hard surface results in an explosion, self-ignition, gas escaping, or the lighter's subsequent safe operation is impaired
- "Burning-time" failure, which means the lighter is incapable of withstanding a burning time of 5 seconds without burning or distorting components leading to a hazardous condition
- Refilling problem: fuel leakage or gas escapes
- Failure to withstand extreme temperature i.e., the lighter explodes when exposed to a temperature of 55° Celsius (or 131° Fahrenheit) for 4 or more hours.

In general, only the data from IPII and INDP provided sufficient detail on the type of hazard and the type of malfunction involved (as described above) in each incident.

Results

Estimated Residential Structure Fire Losses Attended by the Fire Service: An estimated 330 non-incendiary and non-suspicious residential structure fires caused by faulty cigarette lighters were attended by fire departments nationwide between 1994 and 1999. There were an estimated 90 injuries and 10 deaths associated with these fires. The total estimated property loss was $2.8 million dollars. Table 1 provides the yearly details. Because of the relatively small size, the annual fire estimates are shown as rounded to the nearest ten (instead of the customary 100). The injury estimates are also rounded to the nearest ten, the death estimates to the nearest 5 and the property loss estimates to the nearest tenth of a million dollar.

Effective for 1999, the NFIRS data coding system underwent a major revision. For this reason, estimates for 1999 are not comparable to the estimates for the previous years. Hence, it is recommended that 1999 estimates shown in Table 1 below be excluded when looking at any trend.

Table 1
Annual Estimated Residential Structure Fire Losses Resulting From Cigarette Lighter Malfunctions

	FIRES	INJURIES	DEATHS	PROPERTY LOSS (IN MILLIONS)
1994	70	40	10	$1.0
1995	70	20	0	$0.6
1996	50	10	5	$0.3
1997	50	10	0	$0.3
1998	30	10	0	$0.6
1999**	60	10	0	$0.0
TOTAL	330	90	10	$2.8
Mean	60	20	0*	$0.5

Source : NFIRS and NFPA, 1994 – 1999
Note : Sum not equal to total due to rounding
* : Before rounding, annual average number of deaths was 2.0
** : The data for 1999 was compiled using a new coding system and should not be compared with data from earlier years.

Estimated Injuries Treated in Hospital Emergency Rooms: The emergency room-based data show that there were an estimated 3,015 injuries (sample size = 69, cv=0.15) treated over the six year period 1997 – 2002, that were caused by cigarette lighter malfunctions. The annual estimates are presented in Table 2 below. These annual estimates should be interpreted with caution since they are based on small sample sizes with large coefficients of variation associated with them.

Table 2
Annual Estimates of Emergency Room Treated Injuries Resulting From Cigarette Lighter Malfunctions

	ESTIMATED INJURIES* (SAMPLE SIZE)	COEFFICIENT OF VARIATION	95% CONFIDENCE INTERVALS
1997	549 (13)	0.315	210 – 888
1998	433 (10)	0.421	76 – 790
1999	587 (12)	0.311	229 – 945
2000	724 (16)	0.304	293 – 1,155
2001	377 (10)	0.368	105 – 649
2002	345 (8)	0.383	86 – 604
TOTAL	3,015 (69)	0.150	2,130 – 3,900
Mean	503 (12)		

Source: NEISS , 1997 – 2002
*** Sample size in parenthesis**

There were no deaths reported from the emergency room data. Over 96% of the injured were treated and released. A majority (about 82%) of the injuries were thermal burns. While various body parts were reported to have been injured, face, hand, and finger injuries accounted for nearly 80% of them. About 71% of the injured were males, while 29% were females. Nearly 80% of the victims were between 15 and 64 years of age. Table 3 below shows the breakdown of the total estimated injured persons by age groups.

Table 3
Age Distribution of Persons Treated at Emergency Rooms for Injuries Caused by Cigarette Lighter Malfunctions

AGE GROUPS	ESTIMATED NUMBER OF PERSONS	SAMPLE SIZE	COEFFICIENT OF VARIATION
0 - 4 years	11	2	0.655
5 – 14 years	491	13	0.398
15 – 24 years	827	20	0.293
25 – 44 years	1,167	23	0.256
45 – 64 years	413	8	0.453
65 years and over	85	2	0.825
Unknown	19	1	1.000
TOTAL	3,015	69	0.150

Source : NEISS, 1997 – 2002
Note : Sum not equal to total due to rounding

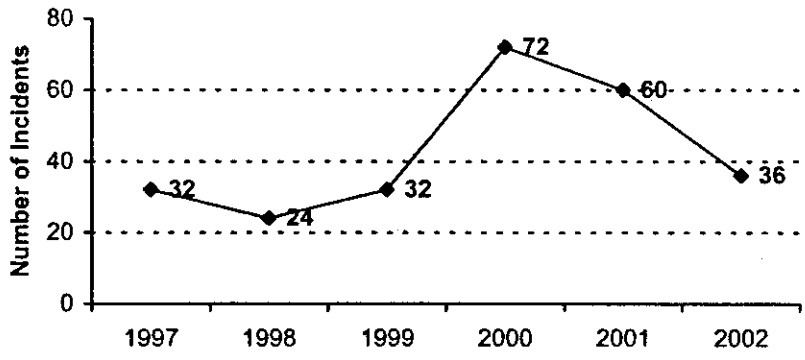
The emergency room data showed that a fire was involved in 30% of these injury-causing incidents. Fire department involvement was unrecorded in 74% of these fires, while no fire department attended the fires in the remaining incidents.

Incidents from Other Sources: One death was identified from the DTHS file that may have involved a cigarette lighter malfunction. On March 10, 2001, a 76-year old woman died from 3rd degree burns to over 90% of her body. There were no witnesses to the incident. The report from the county sheriff's office concluded that the victim either accidentally ignited her clothing with the lighter while smoking or the lighter sprayed fuel onto her while she was lighting her cigarette.

Based on newspaper clippings, consumer complaints, medical examiners' reports and some in-depth investigation reports, a total of 256 incidents (an annual average of about 43 incidents) related to cigarette lighter failures were identified from 01/01/97 through 12/31/02. The annual data are shown in Figure 1. Fifty of these incidents (around 20%) were followed up through in-depth investigations. Consumer complaints accounted for 63% of the 256 reported incidents. An additional 20% of the incidents were reported through the CPSC web site. While not a statistical sample of all incidents that occurred during the time period, these reports provide useful product-specific and scenario-specific detail.

Figure 1

Cigarette Lighter Malfunction Incidents



Source: IPII and INDP, 1997-2002

In 153 of the 256 incidents, there were no injuries. The remaining 103 cases involved 107 individuals. Three of the individuals died, 6 were hospitalized, and the majority (88) were treated and released. The conditions of the remaining 10 persons were unknown. The deaths reported here were in addition to the deaths estimated through the NFIRS system.

Among the 107 individuals who were reported injured, 51 were known to be males and 49 females. Age was unknown for 24% of the persons injured. Sixty six percent of the

individuals were in the 15 through 64 age group. There were no injuries to children under 5; two injuries were sustained by 5 to 14 year olds, and 8 injuries by individuals 65 years and older. In the 153 incidents with no injuries, the age of the complainant was unavailable.

Information on the extent of property damage was usually unavailable from these reports. Only 12 of the 256 incidents mentioned some property loss that ranged from minimal to $125,000.

Failure Patterns: Based on information from the IPII and INDP files, explosion due to pressure or volumetric displacement was, by far, the most common type of malfunction in these lighter incidents[1]. According to ASTM F400-00, when the liquid portion of the lighter fuel exceeds 85% of the volumetric capacity of the fuel chamber or the lighter fails to adequately withstand internal vapor pressure, fire or explosion can occur. From the incident scenario descriptions, it was evident that sometimes pressure or volumetric displacement led to a fire; at other times there was no fire but explosion itself was the hazard. The distribution of the hazard type of incidents by type of malfunction is shown in Table 4 below. Examples of typical incidents involving various types of malfunctions are provided in Appendix 2.

Table 4
Distribution of the Type of Malfunction Identified in Cigarette Lighters

	HAZARDS			
TYPE OF MALFUNCTION	Fires	Explosions	Other	TOTAL
Pressure / volumetric displacement	34	41	6	81
Flame control / height adjustment	36	1	1	38
Refilling: Fuel leakage / gas escapes	28	1	9	38
Failure to extinguish	29	0	0	29
Sparks / flaring / self-ignition	21	0	1	22
Failure to withstand extreme temperature	6	13	0	19
"Drop test" failure	1	11	1	13
"Burning time" failure	8	2	2	12
Other / unknown	3	0	1	4
TOTAL	166	69	21	256

Source: IPII and INDP, 1997-2002

Pressure or volumetric displacement malfunction led to all three deaths reported in the IPII and INDP incidents. In 2 of the 3 deaths, the victims were burned in fires that resulted from explosions; in the third case, only "explosion" is indicated as the hazard type. In 3 of the 6 serious injuries needing hospitalization, lighters exploded causing fires. The other 3 individuals were also burn victims, but the fires were caused by other lighter failures. Detailed information on these incidents is provided in Appendix 3.

[1] Based on the incident narratives, it was not possible to determine whether the explosion was pressure or volume related.

Products Involved: From the 256 incident reports, there were 64 different identifiable manufacturers / model brands, with only a handful of cases mentioning the country of origin.

Partial data from 01/01/03 – 05/31/03: Although it would provide an incomplete picture, it was considered worthwhile to look at the latest available incident data for the first few months in 2003. There were nine incidents of cigarette lighter malfunction reported (mostly consumer complaints) in IPII. Five of them involved no injuries, 3 involved burn injuries and in the remaining incident, the victim received a cut. All 4 injured individuals were treated and released. The victims (3 males and 1 female) ranged in age from 20 to 61 years. A variety of malfunctions were involved – 4 cases of lighter flame flaring up, 2 cases of probable pressure or volumetric displacement causing explosions, and another 2 cases with lighter parts falling apart. In the last incident, there was fluid leakage after the consumer refilled the lighter. Five of the lighter failures caused fires, 2 caused explosions, while the remaining 2 posed a fire hazard.

No incidents involving cigarette lighter malfunctions could be identified in the INDP database for this time period.

Summary

The purpose of this data search was to document the hazards posed by mechanical failures of disposable cigarette lighters. Based on the most recent data available from NFIRS, a total of 330 (an annual average of 60) residential structure fires were estimated for the period 1994 – 1999 that were caused by faulty cigarette lighters. There were an estimated 90 injuries and 10 deaths associated with these fires and the property damage was estimated at almost 3 million dollars over the six-year period. Based on the most recent years with available NEISS data, 1997 – 2002, an estimated total of 3,015 injuries, mostly thermal burns to face, hands, and fingers, that were results of malfunctioning cigarette lighters, were treated in hospital emergency rooms. Over 96% of the injured were treated and released. For the same time period, 256 incident reports related to cigarette lighter failures were received; 65% of these cigarette lighter failures resulted in fires, some leading to serious injuries and deaths. Of the many types of mechanical failures identified in these reports, pressure and volumetric displacements were the most common.

Appendix 1: Data Sources

NFIRS: The National Fire Incident Reporting System. This is the U.S. Fire Administration's voluntary data reporting system, containing incident reports from fire departments nationwide on fires that they attend. The data cover about 40% of all U.S. fires. At this time, 1998 is the latest year with available NFIRS data. For this search,

- Only non-incendiary and non-suspicious residential structure fires were included. For fire-related injuries and deaths, only non-fire fighters were included.

- For 1994 -1998, the variables used for identification of lighter malfunctions were *Form of Heat of Ignition* (code=46, Lighter, Flame Type) and *Ignition Factor* (code=5, Mechanical Failure, Malfunction). For 1999, the variables used were *Cause of Ignition* (code=3, Failure of Equipment or Heat Source), *Heat Source* (code=65, Cigarette Lighter), and *Factors Contributing to Ignition* (codes beginning with 2, 3, and 4, for Mechanical Failure, Electrical Failure, and Installation Deficiency).

- The calculation of the proportion of residential structure fires and fire losses (injuries, deaths, and property damage) that were caused by faulty cigarette lighters was done separately for each year, from 1994 through 1999.

- These proportions were multiplied by the appropriate NFPA estimates of U.S. residential structure fires and fire losses to arrive at the national estimates of these fires and fire-related casualties. The National Fire Protection Association (NFPA) estimates the total number of fire incidents and the related fire losses such as injuries, deaths, and property loss in the U.S. based on their annual probability survey.

- Throughout the estimate-calculation process, any missing data were allocated proportionately to the known data using an iterative procedure known as raking.[2,3]

NEISS: The National Electronic Injury Surveillance System. It is a probability sample of injuries treated at hospital emergency rooms around the nation. The sample consists of about 100 hospitals. Each record in the database pertains to an injury and includes information on the date of treatment, up to two codes to identify the product involved, the sample incident weight, and a narrative describing the incident. For this data search,

- At first stage, product codes for *Cigarette /Pipe Lighters* (1604) or *Lighters, Not Specified* (1687) with treatment dates between 01/01/1997 and 12/31/2002 were selected.

---

[2] M.A. Greene, L.E. Smith, M.S. Levenson, S. Hiser, J.C. Mah. "Raking Fire Data". *Proceedings of the 2001 Federal Committee on Statistical Methodology Research Conference.* Arlington, VA, 2001.

[3] Izrael, D., Hoaglin, D., Battaglia, M. A SAS Macro for Balancing a Weighted Sample. *SAS Users Group International (SUGI) 25th Annual Conference.* April 9-12, 2000, Indiana Convention Center, Indianapolis, Indiana. Paper 258-25.

- Second stage selection was based on careful examination of the narrative in each case to ensure that a cigarette lighter failure was indicated.

- The weights were then used to derive the national estimates of such injuries.

DTHS: This file contains death certificates that are bought by CPSC from all 50 states as well as Washington D.C. and New York City. Following the system of International Classification of Diseases, the external cause of death has been coded on the certificates for each death. The CPSC criteria for selecting the external codes to purchase depend on projects of interest. For this search,

- Data from 01/01/1997 through 12/31/2002 were selected where product codes were *Cigarette / Pipe Lighter* (1604) or *Lighter, Not Specified* (1687).

- The narratives of the above selected records were carefully examined to determine whether a cigarette lighter failure was indicated.

IPII: The Injury or Potential Injury Incident file. The data here are based on reports from newspaper clippings, consumer complaints, and medical examiner reports. The data include scenario specific detail such as hazard type, and product related detail such as manufacturer / model name and date of purchase. For this search,

- First stage selection was of incidents occurring between 01/01/1997 and 12/31/2002 where the product codes were *Cigarette / Pipe Lighter* (1604) or *Lighter, Not Specified* (1687).

- Second stage selection was based on careful scrutiny of the case narratives to include only the incidents where mechanical failure of the cigarette lighter was clearly indicated.

INDP: The In-Depth Investigation file. The data contain information from detailed investigation reports resulting from CPSC interest in particular product hazards. For this search,

- First stage selection was of incidents occurring between 01/01/1997 and 12/31/2002 where the product codes were *Cigarette /Pipe Lighter* (1604) or *Lighter, Not Specified* (1687).

- Second stage selection was based on careful scrutiny of the case narratives to include only the incidents where mechanical failure of the cigarette lighter was clearly indicated.

- Some of the records were in-depth investigations of the incident reports from IPII. Care was taken not to double count those cases.

Appendix 2 : Examples of Different Types of Cigarette Lighter Malfunctions

Document No.	Incident Date	Age/Sex	City/State	Injury / Body part	Malfunction	Hazard	Incident
N9730155A	02/01/97	72 / M	Asheville, NC	Burn / Back, neck, arms	Explosion from pressure / volumetric displacement	Explosion and fire	Victim sustained burn injuries when his cigarette lighter exploded as he tried to light a cigarette while walking down the street. His shirt then caught fire.
H9720118A	02/11/97	Unknown	Halifax, PA	None	Failure to extinguish	Fire	Whenever consumer lets go of plastic button from disposable cigarette lighter that holds gas to burn flames, button remains down, and flame continues to burn.
H9730226A	03/01/97	Unknown	Nashua, NH	None	Flame adjustment problem	Fire	Consumer noticed that flame from disposable lighter jumps up to 9" without flame adjustment and feels lighters present a burn / fire hazard.
H9730141A	03/14/97	63 / F	Tonawanda, NY	Burn / Finger	Other	Fire	The metal head detached on a disposable child resistant cigarette lighter and flames came from the area.
J98A0014A	03/16/97	Unknown/F	Washington, DC	Burn / Hair	Flaring	Fire	Victim's cigarette lighter flared up as she attempted to light a cigarette and ignited her hair.
H9780160A	08/15/97	52 / M	Marco Island, FL	Burn / Hand	Failure to withstand extreme temperature	Fire	The inside of a car ignited when a cigarette lighter was left on the passenger seat.
C99C0014A	01/01/99	Unknown	St. Louis, MO	None	"Burn time" failure	Fire	A cigarette lighter heats up during use and parts can launch off.
H0030344A	03/31/00	45 / F	St. Petersburg, FL	None	Refill - gas escape	Other	Complainant bought a hard plastic butane cigarette lighter. One hour later, lighter was out of fuel. She experienced shortness of breath and numbness in legs.
H0060343A	06/27/00	44 / F	Rocky Mount, NC	Bruise / Eye	"Drop test" failure	Explosion	A cigarette lighter had fallen to the ground and exploded. A piece of plastic projected from the lighter and hit the victim in the eye. She suffered a bruise on her left eye.

Appendix 3

Reported Serious Injuries from Cigarette Lighter Malfunction Incidents : IPII & INDP, 1997-2002

Document No.	Incident Date	Age/Sex	City/State	Injury / Body part	Malfunction	Hazard	Incident
981102HEP8213	10/28/98	10 / M	Columbus, OH	Burn / Arms, chin, chest	Flaring	Fire	The victim was trying to burn leaves with a lighter when the flame flared up and caught his shirt.
X0073124A	01/01/00	Unknown / M	Unknown, CA	Burn / Unknown	Flame control	Fire	Victim's lighter ignited fire ball while he was lighting a cigarette.
I0050084A	05/07/00	Unknown / M	Oakridge, TN	Burn / Unknown	Refill : fuel leakage	Fire	A faulty disposable butane cigarette lighter probably leaked butane, unknown to victim, onto his shirt. Shirt ignited when he lit the cigarette lighter.
020107HEP9001	12/20/01	40 / F	Brookville, OH	Burn / Face, hands	Explosion from pressure / volume displacement	Fire	The victim was injured while lighting a Furnace at her home. When she lit the Furnace with a lighter, it blew up and burned her face and hands.
G0240011A	03/21/02	85 / M	Clyde, OH	Burn / Hand, neck	Explosion from pressure / volume displacement	Explosion	Victim was injured after a cigarette was placed into an ashtray that also contained a lighter and the lighter blew up.
F0245015A	04/11/02	56 / F	Milwaukie, OR	Burn / Arm, side	Explosion from pressure / volume displacement	Fire	Victim attempted to light a cigarette with a lighter when the lighter exploded and fell into her pocket. Victim was burned along with her clothes.

Reported Deaths from Cigarette Lighter Malfunction Incidents : IPII & INDP, 1997-2002

Document No.	Incident Date	Age/Sex	City/State	Fatal Injury	Malfunction	Hazard	Incident
000525CCC0704	12/08/99	80 / M	Portland, TN	Burn	Explosion from pressure / volume displacement	Fire	A disposable butane cigarette lighter exploded in the right front pocket of victim's overalls. He was in his yard at the time. No witnesses to the incident.
X003084A	01/28/00	49 / M	Roxboro, NC	Burn	Explosion from pressure / volume displacement	Fire	A cigarette lighter exploded in victim's shirt pocket.
F01B5003A	10/30/01	65 / M	Riverbank, CA	Burn	Explosion from pressure / volume displacement	Fire	The cigarette lighter that the victim was using exploded. As his clothes were Burning, he ran from room to room setting a number of small fires. His wife turned the kitchen sink hose on him to extinguish his clothing flames. Victim Expired eight days later.