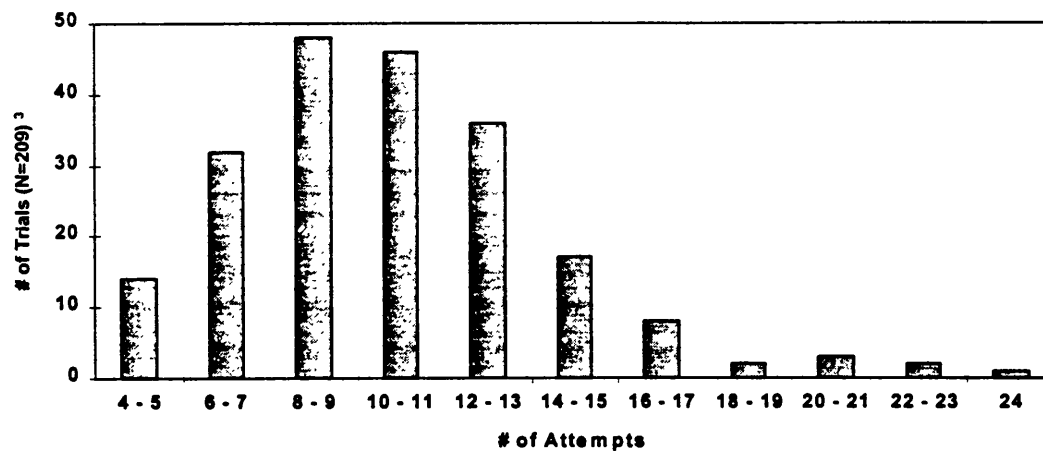


Table 2
NUMBER OF OPERATIONS BY TYPE OF LIGHTER/CR MECHANISM

Lighter Type	Model	Min	Max	Mean	SD
Spark Wheel	A	4	14	8	2.08
	B	5	14	9	2.22
	C	7	17	12	2.70
Piezoelectric	D	4	16	8	3.39
	E	4	15	10	2.85
	F	5	17	12	3.13
	G	8	24	14	4.44
Overall		4	24	10	3.65

Figure 1
FREQUENCY DISTRIBUTION OF NUMBER OF ATTEMPTS (ALL TRIALS)³



³One trial was excluded because a subject discovered a means of overriding the reset mechanism on one sample.

Discussion

As stressed by industry representatives, grill-type multi-purpose lighters do not always light immediately. However, there is little evidence in the available incident data, or in the outcome of staff's research, that the unreliability of current multi-purpose lighters exposes consumers to a dangerous flashback hazard. In ESME's testing, across brands, most multi-purpose lighters produced a flame in one to three operations. Testing by LSE and assessment by HS indicate that the flashback resulting from a 15-second delay in igniting a gas grill is very unlikely to set fire to a user's clothing, and creates little or no risk of burn injuries serious enough to require hospitalization.

The results of the HF study provide no evidence that the addition of single-operation CR mechanisms would interfere with consumers' use of multi-purpose lighters to an extent that would increase the risk of flashback injuries. In every 15-second trial the subjects operated the CR test lighters in excess of the average number of attempts required to achieve a flame with the brands of multi-purpose lighters tested by ESME. The lighter industry now has several years' experience in the design of CR cigarette lighters. Since the effective date of the Safety Standard for Cigarette Lighters, the CR mechanisms used have evolved, and current designs are considerably more convenient for adults to use than older models. It can be assumed that industry will apply the experience gained in the development of CR cigarette lighters to multi-purpose lighters. Due to market forces, it is therefore likely that CR mechanisms for multi-purpose lighters will be easier to operate than a number of those tested in this study.

The lighters tested varied in difficulty from a rather cumbersome design that requires three separate actions for many users, to a convenient design that allows users to release the CR mechanism and depress the operating mechanism in a continuous motion. The subjects participating in the study generally were inexperienced at using lighters, and were unfamiliar with the types tested. Because the subjects were both volunteers and Commission employees, the specific results of this study cannot be generalized to the population at large. However, manual dexterity and other variables that contribute to the performance of simple motor tasks are normally distributed in the population. It seems unlikely that a sample of white-collar professionals from diverse fields would perform markedly better than the general population of working adults.

Under abnormal operating conditions involving product malfunctions, fuel leaks, or significant user error, any ignition source can produce a potentially life-threatening explosion. Barring these circumstances, the results of the HF study indicate that there are a variety of single-operation CR mechanisms that consumers can operate several times within a safe period of ignition delay. It thus appears feasible to design multi-purpose lighters with single-operation CR mechanisms that do not increase the risk of flashback injuries.

Conclusion

The outcome of staff's evaluation supports the premise that allowing multi-purpose lighters with single-operation CR mechanisms does not create an increased risk to consumers of serious injury from flashback.

References

Nakamura, S. (August 11, 1999). Severity of burns resulting from flash fire. Memorandum to Barbara J. Jacobson. Directorate for Health Sciences, U.S. Consumer Product Safety Commission.

Perry, E.F. & Paul, C. (July 7, 1999). Multi-Purpose Lighter Ignition Tests. Memorandum to Barbara J. Jacobson. Directorate for Engineering Sciences, U.S. Consumer Product Safety Commission.

Rowe, W. (August 12, 1999). Flashback Associated with Gas Grills. Memorandum to Barbara J. Jacobson. Directorate for Laboratory Sciences, U.S. Consumer Product Safety Commission.

Smith, L.E. (June 17, 1999). Burn Hazard Associated with Lighting Gas-Fueled Products. Memorandum to Barbara Jacobson. Directorate for Epidemiology, U.S. Consumer Product Safety Commission.

TAB E



UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, DC 20207

Memorandum

Date: August 22, 1999

TO : Barbara J. Jacobson, Project Manager,
Directorate for Health Sciences

THROUGH: David A. Walden, Acting Associate Executive Director, *DAW*
Directorate for Laboratory Sciences
Robert T. Garrett, Director, Division of Engineering, LS

FROM : William Rowe, Mechanical Engineer, LSE *W Rowe*

SUBJECT : Flashback associated with gas grills

Background:

Members of the lighter industry claim that a reset requirement for the child-resistant mechanism of multi-purpose lighters could create the potential for flashback in situations such as igniting a gas grill. In the context of this project, flashback describes the momentary flare up of accumulated fuel when there is a delay in igniting gas appliances such as gas grills. The industry position is based on multi-purpose lighters often requiring repeated attempts at operation to achieve a flame. For most multi-purpose lighters, pulling a trigger or button simultaneously releases butane gas and generates a piezo-electric generated spark near the tip of the nozzle. The spark ignites the gas and creates a flame.

Based on earlier limited gas grill work conducted by the Directorate for Laboratory Sciences (LS), the staff concluded that the potential for injury from flashback would be minimal for short periods of delayed ignition such as, 5 or 10 seconds. The staff acknowledged that the potential for injury could increase as the period of delayed ignition increased. (Memo, June 29, 1998 – TAB G Briefing Package – Proposed Standard for Multi-Purpose Lighters, July 15, 1998)

Purpose:

The purpose of this study was to determine a “safe” time window – the time, in seconds, a consumer has to safely ignite a gas grill after the gas has been turned on. A hazardous condition would occur if the flashback event could ignite fabric, such as clothing.

Grill Operation:

A gas grill is operated by first opening the tank's valve so gas can flow through a flexible line to the grill. A control valve located on the front panel regulates the gas flow through rigid tubing to the gas burner(s) in the bottom of the grill. The burner is lighted by a spark from the electronic igniter on the grill, or by an open flame from a lighter or match. In normal operating conditions the gas is ignited as soon as it reaches the burner. If ignition is delayed for any reason, a propane gas and oxygen mixture begins to accumulate.

Test Equipment:

Three gas grills

Small - 10 x 6 x 19½ inches (254 x 152 x 495 mm)

Medium - 14 x 6¾ x 22½ inches (356 x 171 x 512 mm)

Large - 16 x 6 x 26 inches (406 x 152 x 660 mm)

Plastic pipe - 2-inch diameter (51 mm), 12-inch (305 mm) long

Cheesecloth sleeve - 2.75-inch (70 mm) diameter – double layer

Laboratory stand and Visegrip™ pliers to hold plastic pipe

Paper scale marked in 1-inch (25 mm) increments to measure flame height

Multi-purpose lighter as ignition source

NOTE: Cheesecloth has been used to indicate the propensity to ignite nearby combustibles in other testing including halogen lamps, space heaters, and toaster ovens. For heaters tested under UL – 647 "Unvented Kerosene-Fired Room Heaters "and" Portable Heaters, a failure occurs when the cheesecloth ignites.

Test Set-Up:

- Testing was conducted in the Building G burn room at the CPSC Engineering Laboratory.
- The room was darkened so that any flashback events could be clearly seen and recorded.
- A color video camera was used to record the flame height and flame duration.
- A cheesecloth sleeve was placed over the plastic pipe to represent a garment sleeve on an arm. The pipe was supported at a 45-degree angle over the cooking surface of the grill. The height was adjusted so that the bottom edge of the sleeve touched the cooking surface.
- A paper scale marked in 1-inch increments (0 to 10 inches) was placed directly on the cooking surface to measure the flame height in inches above the cooking surface.

Test Procedure:

- The gas valve on the grill was opened to release the maximum amount of propane.
- The multi-purpose lighter was operated to achieve and maintain a flame.
- As the gas was turned on, a stopwatch was started to measure the elapsed time in seconds.
- The propane was ignited by inserting the lighted multi-purpose lighter through the lighting hole in the side of the grill body.
- The grill was allowed to cool to room temperature before the next test trail was initiated.

Results of Preliminary Grill Tests:

A number of preliminary tests were conducted with the three grills using ignition delays from 0 to 20 seconds. The purpose of these preliminary tests was to determine the appropriate procedures for the grill tests. The preliminary tests indicated:

- Longer ignition delays resulted in flames that were higher and of longer duration.
- The smallest grill body, which had the least volume, presented the “worst-case” flashback condition compared to the larger grills. Ignition resulted in the highest flame above the cooking surface.
- Grills at room temperature produced higher flames than hot grills.
- Flame heights above the cooking surface ranged from 0 inches (0 mm) to about 15 inches (380 mm).
- The shortest delay resulting in any singeing of the cheesecloth sleeve was 10 seconds.
- Ignition of the cheesecloth sleeve was observed with an ignition delay of 20 seconds.
- The duration of the entire flashback event from the time of ignition to the time the flame was completely extinguished was approximately one second or less.

Results of Grill Tests

Based on the results of the preliminary tests, 15 additional trials were conducted using “worst-case” conditions – the smallest grill at room temperature, and sleeve placement touching the cooking surface above the ignition point. The gas was turned on and allowed to accumulate for 15 seconds before ignition. Fifteen seconds provided the “worst-case” condition of ignition delay short of ignition of the cheesecloth sleeve. The results of these tests showed:

- The height of the flashback in each trial was between approximately 10 and 15 inches (254 - 381 mm).
- There was slight singeing around the circumference of the cheesecloth sleeve edge in all trials.
- There were no ignitions of the cheesecloth sleeves.
- The duration of the entire flashback event from ignition to the time the flame was completely extinguished, as observed on the videotape, ranged from 0.6 to 1.1 seconds.

Results of Confirming Grill Tests:

Several trials using a 15-second ignition delay were conducted on the mid-sized and largest grill. These trials confirmed that the smallest grill presented the “worst-case” condition.

- The height of the flashback in each trial exceeded 10 inches (254 mm), but was less than 15 inches (381 mm).
- There was no singeing of the cheesecloth sleeves.
- There were no ignitions of the cheesecloth sleeves.
- The duration of the entire flashback event from ignition to the time the flame was completely extinguished ranged from 0.3 to 0.4 seconds.

Conclusions:

The results of the grill tests conducted under the “worst-case” conditions demonstrate that a 15-second ignition delay results in a flashback of very short duration (0.6 to 1.1 seconds). The flashback generated a flame approximately 10 inches (254 mm) to 15 inches (381 mm) above the cooking surface, when observed in a dark room. The flame duration was very brief and did not transfer sufficient energy to ignite a cheesecloth sleeve, when the sleeve edge was in direct contact with the cooking surface over the point of propane ignition. The results of these tests suggest that flashback resulting from a 15-second ignition delay is unlikely to ignite clothing.

TAB F



UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, DC 20207

Memorandum

Date: August 11, 1999

To : Barbara Jacobson, Project Manager, Directorate for Health Sciences

Through : Mary Ann Danello, Ph.D., Associate Executive Director,
Directorate for Health Sciences *mad*

Lori E. Saltzman, M.S., Director, Division of Health Sciences *l*

From : Suad Nakamura, Ph.D., Physiologist, Division of Health Sciences, x-1202 *SN*

Subject : Severity of burns resulting from flash fire.

On September 30, 1998, the Commission published a proposed safety standard to address the risk of death and injury associated with multi-purpose lighters. If finalized, this standard would require multi-purpose lighters to have a child-resistant feature.

A literature search was conducted to evaluate the potential for burn injury resulting from flash fires. This information was necessary to determine whether adding a child-resistant feature that resets after each operation of the ignition mechanism would delay operation of the lighter and create the potential for flashback explosions in situations such as igniting a gas grill.

Burn damage begins when the temperature of the tissue reaches 40° C. The rate of injury then increases logarithmically as the tissue temperature rises (Henrique, 1947). The temperature necessary to produce a burn injury to the human skin is a function of many inter-related factors, including initial skin temperature, incident heat flux (thermal conductivity of the skin), and duration of exposure to the heat source (Henrique and Knox, 1947 and Ripple et al., 1990). The severity of a burn depends partly on the surface area of skin that is damaged and partly on the depth of the burn. Burns to the skin are classified according to their severity as first-, second- or third-degree burns (Bullock and Rosendahl, 1992). In first-degree burns, damage is limited to the epidermal layer of the skin. First-degree burns result in superficial damage to the outer layer of the skin. The affected area is red, swollen and painful. First-degree burns are similar to a mild sunburn and heal in two to three days. Second-degree burns result in blistering of the upper layers of the skin, and scarring can result. Second-degree burns are extremely painful because the unburned nerves become exposed. If care is taken to prevent infection, and the affected area is

small, second-degree burns heal within three to four weeks with little or no scarring. Third-degree burns involve the full thickness of the skin. Although skin regeneration might eventually occur, skin grafting is usually necessary to prevent fluid loss and infection during the lengthy recovery period. Third-degree burns are also characterized by lack of pain in the affected area, due to loss of nerve elements.

Burns are considered serious enough to require hospitalization when: (1) 10% or more of the total body surface area (TBSA) has second- or third-degree burns, in patients under 10 and over 50 years of age; (2) 20% TBSA in all other age groups; (3) 5% or more of the TBSA has third-degree burns, or; (4) when the third-degree burn is to the face, hand, foot, or joint. Facial burns are critical because they may affect the respiratory system (McManus and Pruitt, 1991).

Flash fires are usually caused by sudden ignition of a flammable substance, are typically short in duration, and are characterized by an intense heat flux. The flame from a flash fire can generate temperatures of about 1050-1150°C (1900-2100 °F) with heat fluxes of 12.6 to 16.8 J/cm² (Knox, et. al., 1979). Accurate measurement of the amount of heat transfer to the skin is difficult because of the short duration of such fires and the rapid change of heat flux (Ripple, 1990). While temperature-sensing instrumentation and other measuring devices can detect rapid changes in temperature, the time of the temperature change cannot be used to accurately quantify or predict the extent and severity of thermal burns following brief exposure to an intense heat source. Because the response times of such devices are slower than the rapid change of events of a flash fire, mathematical models are used to predict thermal stress on the surface of the skin caused by convection and radiative heat (Ogrill et al., 1998 and Torvi and Dale, 1994). Thermal exposures to flash fire lasting less than one second are unlikely to cause second-degree burns because the lower layer of the skin requires more than one second exposure to equilibrate with the outside temperature (Ripple, 1990).

Work at the CPSC Engineering Laboratory was conducted with propane gas grills to determine a “safe” window between the time the gas is turned on and the time the gas is ignited. The results of this testing using “worst-case” conditions indicated that a flash of fire, 0.6 – 1.1 seconds in duration, is produced when the propane is allowed to accumulate for 15 seconds prior to ignition. The flame radiation temperature of propane is 1561° K (Mudan and Coroce, 1990) which is equivalent to 1287.85° C. Based on radiant thermal energy experiments, exposure to a propane flame for 1 second could transfer sufficient heat to produce second-degree burns. However, second-degree burns would not be considered serious enough to require hospitalization unless they covered at least 10 percent of the TBSA. In the context of using a multi-purpose lighter to ignite a gas appliance, it is unlikely that a burn injury requiring hospitalization would occur as a result of a flash fire resulting from gas accumulation during a 15-second ignition delay.

References:

Bullock, BL. Alteration in skin integrity. In: Bullock and Rosendahl (Eds). Pathophysiology, Adaptations, and Alterations in Function. Philadelphia, PA: JP Lippincott Co.3rd. Ed, 1992.

Henriques, FC. Studies of thermal injury. V. The predictability and the significance of thermally induced rate processes leading to irreversible epidermal injury. Arch Pathol 1947; 43:489-502.

Henriques, FC and Moritz, AR. Studies of thermal injury. 1. The conduction of heat to and through skin and the temperatures attained therein. A theoretical and experimental investigation. Am J Pathol. 1947; 23:531-549.

Knox, FS, Watchel, TL, McCahan, GR. Bioassay of thermal protection afforded by candidate flight suit fabrics. Aviat Space Environ Med.1979; 50:1023-1030.

McManus, WF. Thermal injuries. In : Moore, EE,,Mattox, KL, Feliciano (Eds).Trauma. East Norwalk, CT: Appleton & Lange 2nd ed., 1991.

Moritz, AR. and Henriques, FC, "Studies of Thermal injury. II .The relative importance of time and surface temperature in the causation of cutaneous burns." Amer. J. Pathology 1947;234:695.

Mudan, KS and Coroce, PA. Fire hazard calculations for large open hydrocarbon fires Sec. 2-71. In: DiNenno, PJ, CL Beyler, DW Walton, RL Custer and JM Watts (Ed): SFPE Handbook of Fire Protection Engineering, National Fire Protection Association and Society of Fire Protection Engineers Massachusetts. Boston, MA: 1st ed, 1990.

Torvi, DA, Dale ,JD. A finite element model of skin subjected to a flash fire. J. Biomech. Eng. 1994;116(3):250-5.

Orgill, DP. A finite-element model predicts thermal damage in cutaneous contact burns. J. Burn Care Rehabil. 1998 May-Jun;19(3):203-9.

Moritz, A.R. and F.C. Henriques. Studies of thermal injury: II. The relative importance of time and surface temperature in the causation of cutaneous burns. American Journal of Pathology, 1947: 23:695-720.

Ripple GR, KG Torrington, and YY Philips. Predictive criteria for burns from brief exposures. J .of Occup. Med., 990; 32: 215-219.

TAB G



UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, DC 20207

Memorandum

Date: July 7, 1999

TO : Barbara Jacobson, Project Manager, Multi-Purpose Lighter Petition, Directorate
for Health Sciences

THROUGH: Andrew G. Stadnik, Associate Executive Director for Engineering Sciences
Nicholas Marchica, Director, Division of Mechanical Engineering *Andrew G. Stadnik*
NVM

FROM : Eleanor F. Perry, ESME *EP*
Caroleene Paul, ESME *CP*

SUBJECT : Multi-Purpose Lighter Ignition Tests

Introduction:

This memorandum describes ignition tests of six currently available, non child-resistant (no CR mechanism) multi-purpose lighters. These tests were conducted to determine and document the number of ignition attempts needed to obtain a flame.

Samples:

The test sample consisted of three new units of each of the following multi-purpose lighter models:

1. Acme Gas Lighter
2. Coleman 13" Butane Lighter
3. Duraflame Insta-Match
4. Swedish Match EZ Light
5. Ronson
6. Scripto Aim N Flame II

Procedure:

Test setup, lighter conditioning and test implementation were as follows:

1. A guide was drawn and posted for lighter position denoting horizontal, plus (up) and minus (down) 45 degrees from horizontal.
2. A metronome was used to set the rhythm for two ignition attempts per second.¹
3. Paper tickets were prepared for all combinations of lighter and position.
4. Lighter flame height adjusters were set at mid point.
5. Lighters were conditioned overnight at room temperature before each day's tests.

¹ Human Factors tested a sample of ten staff members to estimate the consumer operation time for multi-purpose lighters. Lighters without fuel and subjects unfamiliar with the project were used in the tests. On average the subjects operated the lighter at 0.5 second intervals.

6. Lighter test order and test position were determined on day one by a random drawing of the tickets.
7. Lighters were chosen by random drawing on day 2 and the positions were determined by the previous day's position (horizontal were tested 45° up; down were tested horizontal; and, up were tested 45° down²).
8. On the third day lighters were picked randomly and tested in the position remaining after the previous days' tests.
7. During tests each lighter was activated in its selected position using the guide to assure uniform position and the metronome to time ignition attempts.

Results: Table 1 summarizes the test results.

TABLE 1
ACTIVATION ATTEMPTS TO OBTAIN A FLAME

Lighter	Horizontal	45° up	45° down	Day 1	Day 2	Day 3
ACME 01 ³	1	1	1	horizontal	up	down
ACME 02	4	2	3	down	horizontal	up
ACME 03	3	2	3	up	down	horizontal
COLEMAN 01	4	2	2	horizontal	up	down
COLEMAN 02	2	2	2	down	horizontal	up
COLEMAN 03	1	2	1	up	down	horizontal
DURAFLAME 01	1	1	1	horizontal	up	down
DURAFLAME 02	1	1	14	down	horizontal	up
DURAFLAME 03	1	2	1	up	horizontal	down
SWEDISH MATCH 01	1	1	1	horizontal	up	down
SWEDISH MATCH 02	2	1	1	down	horizontal	up
SWEDISH MATCH 03	2	1	2	up	down	horizontal
RONSON 01	2	2	3	horizontal	up	down
RONSON 02	13	10	5	down	horizontal	up
RONSON 03 ⁴		1	2	up	horizontal	down
SCRIPTO AIM N FLAME II 01	2	2	1	horizontal	up	down
SCRIPTO AIM N FLAME II 02	2	2	2	down	horizontal	up
SCRIPTO AIM N FLAME II 03	2	2	2	up	down	horizontal
Average	2.59	2.05	2.61			

² Duraflame 03 and Ronson 03 were tested horizontal

³ trigger sticks in locked position

⁴ no flame horizontal after 30 attempts

Conclusions:

The number of activation attempts required to ignite the 18 multi-purpose lighters tested varied from 1 to 14. In the horizontal position the number of attempts ranged from 1 to 13 with an average of 2.59 attempts. Lighters held in the 45° up position averaged 2.05 attempts with a range of 1 to 10 attempts. Lighters held in the 45° down position averaged 2.61 attempts and ranged from 1 to 14. The maximum time to ignition (7 seconds) was obtained with the Duraflame 02 Lighter, which required 14 attempts in the 45° up position. The Ronson 02 lighter required 13, 10, and 5 attempts in the horizontal, 45° up and 45° down positions respectively. All other lighters, except Ronson 03, which did not ignite in 30 attempts in the horizontal position, required 4 or less attempts (2 seconds or less) to first flame.

TAB H

CPSA 615X11 Clean
w/ 1 Pass OVO Removal
11/19/19 PZ



UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, DC 20207

Memorandum

Date: JUN 17 1999

TO : Barbara Jacobson, Project Manager, Multi-Purpose Lighter Petition, EH
THROUGH: Susan W. Ahmed, Ph.D., AED, Directorate for Epidemiology *SWA*
FROM : Linda E. Smith, EPHA *LS*
SUBJECT : Burn Hazard Associated with Lighting Gas-Fueled Products

This memorandum provides information documenting the magnitude and severity of the burn hazard associated with flashback or explosion when consumers attempt to light gas-fueled products. The data were assembled to help evaluate requirements for rule-making on child resistance features on multi-purpose lighters.

Methodology:

Injuries associated with the flashback hazard were identified by a search of CPSC data for the time period 1/96 through 3/99. The initial search included all products but was limited to incidents in which the computerized comment or narrative indicated that the incident involved either a flashback or explosion that occurred when the product was being lit,¹ and resulted in thermal or unspecified burns. The resulting data were then further reviewed to identify those injuries that involved gas-fueled products. Databases searched included hospital emergency room-treated injuries (NEISS), the reported incident file which includes newspaper clippings and consumer complaints (IPII), the investigation file (INDP), and the death certificate file (DTHS). No relevant incidents were identified in the death certificate file. Both flashbacks and explosions were included since initial review of the data indicated that both terms were being used to describe similar kinds of incidents and the difference was one of degree which often could not be identified from the information provided. Among the data reviewed, only the investigation reports included sufficient description of the circumstances to indicate features such as product malfunctions, history of use, and consumer interaction with the product. However, incidents were selected for investigation in response to CPSC interest in particular product hazards, especially the more serious hazards, so that the distribution of products in this database may be skewed and contain the most serious injuries.

¹ Incidents were selected when the comment or narrative included the following: the words "flash*" or "explo*" in combination with the words "lit*" or "light*".

Results:

The results of the CPSC data search indicated that there were an estimated 1500 burn injuries treated in hospital emergency rooms annually during 1996 - 1998 that were associated with a flashback or explosion hazard when people attempted to light gas-fueled products. About 1400 of these injuries were treated and released. About 100 annually, eight percent, resulted in hospitalization. No deaths were reported from NEISS. About three-quarters of the injuries occurred to the face or hand. While the data included both injuries that cited flashback and those that cited explosion, the vast majority of the emergency room-treated injuries cited a flashback incident. Annual data are presented below:

Estimated Thermal Burn Injuries Treated in Hospital Emergency Rooms for Flashback or Explosion-Associated Incidents Involving Lighting of Gas-Fueled Products, 1996-1998

Year	Estimate	Sample Size	95 Percent Confidence Interval	Percent Hospitalized ²
Annual Average	1540	45	1110-1970	8
1998	1430	40	835-2030	9
1997	1520	37	900-2140	7
1996 ³	1660	57	950-2380	7

Source: NEISS

These injuries involved a variety of gas-fueled products, but most reports cited grills, ranges, water heaters, furnaces, or heaters. No additional detail about the specific product being lit was reported in most cases. The type of lighting device was specified infrequently, but a few reports cited matches or lighters.

In addition to the hospital emergency room-treated injuries reported through NEISS, CPSC received reports of 20 burn injuries that were reported in newspaper clippings, consumer complaints, or by medical examiners. The products cited were gas grills (6), ranges/ovens (5), camp stoves (3), furnaces (2), water heaters (2), and gas heaters (2). Among these 20 incidents, 3 people died, 11 people were hospitalized, and 16 people were treated for more minor injuries.

Twenty-one additional incidents were investigated by CPSC staff.⁴ Among these incidents, 7 people died and at least 11 people were hospitalized. While the same types of products were involved, the investigative reports contained enough detail to indicate that many of these incidents involved reported malfunctions of various kinds. Some consumers reported smelling gas before the incident; others reported long-standing difficulty with keeping the product lit. Among these incidents, seven cited the use of a match to light the gas-fueled product, two cited the gas grill's igniter, one cited a cigarette lighter, and one cited a multi-

² Includes injuries both admitted to the same hospital and those transferred to another hospital for admission.

³ Estimates and confidence interval for 1996 were adjusted to reflect a change in the sampling frame.

⁴ Five incidents were first reported through NEISS, four in 1996 and one in 1998.

purpose lighter. The remaining ten incidents did not specify the product that was used to ignite the gas equipment. More detail on the 21 investigated incidents is included in the Appendix.

Manufacturer's Incident Data:

One multi-purpose lighter manufacturer provided information on seven incidents that involved its multi-purpose lighter being used to ignite gas grills. Three people received minor burns that did not require treatment. A fourth person received 2nd degree burns to his hands and may have been treated in a hospital emergency room. No injuries occurred in the remaining three incidents. As in the incidents described above, the contribution of the lighter to the incident is uncertain based on the information provided.

Summary:

Review of the available data indicates that flashbacks and explosions that occurred when people attempted to light gas-fueled products resulted in about 1500 burn injuries treated in hospital emergency rooms annually during the period 1996 - 1998. While the majority of injuries were treated and released, about eight percent annually were serious enough to warrant hospitalization. Except for the 21 investigated incidents, most incidents did not contain enough information to determine whether the product being lit was operating properly or whether the consumer delayed lighting the product.

Attachment

Investigated Burn Injuries That Occurred When Gas-Fueled Products Were Being Lit

Obs. No.	Date	Location	Diagnosis	Disposition	Product Being Lit	Ignition Device	Description
1	960130	Kiefer, OK	T/B 1 st deg-face	T/R	Gas Furnace/mobile home	Match	Furnace kept going out, gas valve replaced.
2	960317	Utica, IL	T/B-all	Died-1 day later	Furnace/mobile home	Match	History of difficulty in keeping furnace lit, neighbors smelled gas earlier, occupant was blown out of trailer home.
3	960322	Ross, OH	T/B 2 nd deg-head/hands	T/R	Propane Stove	Match	Burner of stove had been left on before oven was lit. Home condemned after fire.
4	960404	Milltown, WI	T/B T/B 3 people-T/B	Hosp-2 wks Hosp-few days T/R	Furnace	Match	Propane tank overfilled and had leaked into cabin.
5	960908	Palmer Lake, CO	T/B 3 rd deg-25% of body	Hosp	Propane furnace/mobile home		Smelled gas before incident.
6	961031	Chester, IL	T/B-1 st deg-face/neck	T/R	Furnace/mobile home		Repairman said furnace coupler was rusted.
7	960715	Taylor, MI	T/B-face	T/R	Gas grill	MP Lighter	Grill already lit but continued to try to relight.
8	970703	Douglas Twp, PA	T/B-all T/B-all	Died Recovered	Camp stove in mobile home		Difficulty lighting gas stove, clogged pilot or burner allowed gas to escape.
9	960814	Oxford, GA	TB-trunk	T/R	Propane stove	Match	Installing stove, part malfunction.
10	960822	Pender, NB	T/B-42% body	Hosp-burn ctr.	Propane water Heater		History of water heater not staying lit.
11	970501	Leetonia, OH	T/B-2 nd deg-hand/face	Hosp-one nte.	Furnace in camper		Broken gas line to pull-out furnace.

Key: T/B=Thermal Burn, T/R=Treated and Released
 Note: When Ignition Device is blank, the device was unreported.
 Source: CPSC/EHHA, Investigated Incidents, 1996-1998

Attachment Investigated Burn Injuries That Occurred When Gas-Fueled Products Were Being Lit

Obs. No.	Date	Location	Diagnosis	Disposition	Product Being Lit	Ignition Device	Description
12	970827	Rogue River, OR	T/B- 2 nd & 3 rd deg-arm	T/R w follow-up	Gas grill	Prod. ign. switch	Pressed ignition button on gas grill.
13	971104	Clinton, LA	T/B	Hosp-burn ctr.	LP gas space heater		Smelled gas, heater would not stay lit, occupant attempted repair, owner and doors blown into yard (1 person still in hosp. 3 mo. later).
14	971216	Colorado Spg, CO	T/B 2 nd deg-face, hands	Hosp-burn ctr.	Oven		Leaky connection/mobile home, problem known for some time.
15	980223	Erwin, TN	T/B	Died	Propane heater		Propane leak from the heater.
16	980329	Grossbeck, TX	T/B-all	Died	Propane stove/mobile home		Smelled gas before incident, fire self-extinguished.
17	980405	Ragley, LA	T/B	Died in hosp.	Propane range in camper	Cig. lighter	Range burner was left on while occupant went outside to turn on gas.
18	980523	Kewaunee, WI	T/B	Hosp. T/R?	Stove in camper	Match	Smelled gas night before, propane cylinder leaked inside camper.
19	980709	Seattle, WA	T/B-face	Hosp-1 day	Gas grill	Prod. auto igniter	Consumer had just hooked up a new tank of fuel.
20	980305	Aromas, CA	T/B-all	Died	Water heater		Improper connection, heater in poor condition.
21	981207	Hayward, CA	T/B	Died	Kitchen stove	Match	Broken flexible connector to stove, gas leak.

Key: T/B = Thermal Burn, T/R=Treated and Released
 Note: When Ignition Device is blank, the device was unreported
 Source: CPSC/EHHA: Investigated Incidents, 1996 - 1998

TAB I



UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, DC 20207

Memorandum

Date: November 3, 1999

TO : Barbara Jacobson,
Project Manager
Multi-Purpose Lighters

THROUGH: Warren Prunella *wp*
Associate Executive Director
Directorate for Economic Analysis

FROM : Robert Franklin, Economist

SUBJECT : Response to Economic Issues Raised in Public Comments

Several comments on the NPR on multi-purpose lighters raised economic issues. This memorandum provides the Directorate for Economic Analysis' response to these comments.

Issue: Cost of testing and certification is exorbitant and an unnecessary burden on small companies. CPSC has not taken any measures to reduce the burden of the testing on small companies. -- Noel and Adele Zeller, President and Chairman, respectively, of Zelco Industries, Inc.

Response: In the Preliminary Regulatory Analysis, we estimated that the cost of the certification tests would average about \$25,000 per model. This estimate includes both the cost of developing the surrogate lighters and the cost of the testing. The actual costs experienced by an individual manufacturer may vary. For example, manufacturers that use empty production models for the certification testing instead of surrogates and whose models pass the certification test on the first attempt, may have lower costs. On the other hand, manufacturers that must develop surrogate lighters and/or that have to test their lighters multiple times before they pass may incur costs exceeding \$25,000.

CPSC staff did consider the impact of these costs on small businesses. However, such testing is necessary to ensure that all multi-purpose lighters on the market are child-resistant (CR). Furthermore, the cost of the testing needs to be compared to the costs that may be incurred if a multi-purpose lighter is not tested and is later found not to be child-resistant. In that case the manufacturer could incur the costs of a recall and may be subject to liability costs if one of its models was involved in a fire. Therefore, the staff believes that the testing requirements in the rule which are one-time costs for a particular design, helps ensure that consumers will obtain the safety benefits intended. Moreover, requiring all companies to conduct the tests will help

prevent some companies from attempting to bypass the standard and obtain a competitive advantage in the market.

Issue: Some companies may file for patents on child-resistant mechanisms and thereby restrict entry into the market. This may restrict competition, create a hardship on some competitors, especially small ones, and ultimately raise the cost to consumers. --*Thomas J. Moran IV, President, SNC Group, L.L.C.*

Response: The staff acknowledges that some companies may file for patents to protect their proprietary interests in new CR designs. This may make entry into the market difficult for some firms. However, the ability to obtain patent protection for an innovative design provides an incentive for companies to invest in the research and development necessary to develop new and better CR designs.

The experience with the cigarette lighter standard lends support to the idea that patent protection stimulates competition. Several companies had to redesign their early child-resistant designs after competitors came out with patented child-resistant cigarette lighters that were easier to operate. Consumers benefited from this competition, since the new designs were easier to operate.

The rule will likely increase the retail price over what it would be in the absence of the rule. Most of the increase is expected to be related to the costs of developing the CR mechanism, retooling, and added materials and labor. Any increase in retail costs to consumers due to patent protections will probably be slight.

Issue: *Two-year grace period.* One small manufacturer asked for an additional two-year grace period to comply with the rule to give it time to evaluate the patents issued to other companies before commencing its own efforts to either develop new technology or license technology from others. The purpose for its request was its understanding that several other firms were actively pursuing patent applications for child-resistant technology and that it needed to see what these patents covered before beginning to work on its own technology. *Robert F. Stevenson, President, Donel, Inc. Letter dated February 23, 1999, from Robert Stevenson to Barbara Jacobson.*

Response: CPSC staff does not believe that a blanket extension of the time limit for small manufacturers to comply with the rule is an effective method for reducing the burden of the rule on small businesses. Several of the companies that are actively developing child-resistant technology are small firms. Therefore, such an extension would help some small firms at the expense of others, while doing nothing to protect the public from the unreasonable risk. Secondly, our experience with the cigarette lighter safety standard shows us that many firms are unlikely to stop working on child-resistant technology once they have developed a child-resistant

design, but will continue to seek improvements in their designs. Furthermore, new firms may enter the market. Thus, a firm that is waiting for all other firms to introduce their designs before commencing its own development efforts may have to wait much more than a couple of years. In the meantime, if these small firms were allowed to continue to produce non-complying lighters, the effectiveness of the rule in reducing fires, injuries, and deaths would be reduced.

Issue: Swedish Match challenged a statement in the Preliminary Regulatory Analysis that the benefits will be higher if manufacturers achieve a child-resistance level greater than 85 percent. According to the commenter, if a product passes the prescribed test it is child-resistant, period. -- *Matt McLoughlin, Customer Relation Manager, Swedish Match.*

Response: The testing procedure is designed to ensure that all lighters which pass the test have a *minimum* child-resistance level of 85 percent. By "child-resistance level" we mean the percentage of children that were not able to successfully operate the lighter during the prescribed test. Therefore, it is possible for a lighter to have a child-resistance level greater than 85 percent. If a CR level greater than 85 percent were achieved, the benefits of the regulation would be higher. The following example illustrates this point.

Assume a pre-standard multi-purpose lighter model has a baseline CR of 20 percent. The model is redesigned and achieves a CR level of 85 percent. One would expect that the new model would reduce the likelihood of child-play fires by $(0.85-0.20)/(1.0-0.20) = 81$ percent. However, if the redesigned model could not be operated by 95 percent of the children during the prescribed test, the likelihood of child-play fires would be reduced by $(0.95-0.2)/(1.0-0.2) = 94$ percent, thus the resulting benefits would be higher.

Issue: *Substitutes for multi-purpose lighters.* Scripto takes issue with the statement in the "Market Information" section of the Preliminary Regulatory Analysis that there are reasonable substitutes for utility lighters, including matches and cigarette lighters. Scripto contends that utility lighters are a safer method for lighting hard to reach places such as pilot lights, barbecues, and fireplaces, and that, therefore, matches and cigarette lighters were not reasonable substitutes. -- *Mike Forsys, Scripto-Tokai Corporation*

Response: The discussion in the Preliminary Regulatory Analysis of reasonable substitutes for multi-purpose lighters is not meant to imply anything about the relative safety of the various alternatives. It is simply a recognition of the fact that before utility lighters were introduced in 1985, matches and cigarette lighters were used instead of multi-purpose lighters. As stated by David H. Baker (General Counsel, The Lighter Association, Inc.) in his comments to the Commission of 14 December 1998 -- CC99-1-10), "as a practical matter, almost any lighter can be used to light a fireplace or grill."

TAB J



UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, DC 20207

Memorandum

Date: November 18, 1999

TO : Barbara Jacobson
Project Manager
Multi-Purpose Lighters

THROUGH: Warren Prunella *wp*
Associate Executive Director
Directorate for Economic Analysis

FROM : Robert Franklin *RF*
Economist

SUBJECT : Final Regulatory Analysis and Final Regulatory Flexibility Analysis

Attached are revised Final Regulatory Analysis and Final Regulatory Flexibility Analysis for the multi-purpose lighter project.

**Final Rule on Multi-Purpose Lighters:
Final Regulatory Flexibility Analysis
November 18, 1999**

**Robert Franklin
Directorate for Economic Analysis
U.S. Consumer Product Safety Commission**

Introduction

The Consumer Product Safety Commission (CPSC) is issuing a final consumer product safety rule (hereafter referred to as the "rule") to address the risk of accidental fire-related death and injury associated with children under the age of 5 playing with multi-purpose lighters. The Commission published a notice of proposed rulemaking (NPR) and an initial regulatory flexibility analysis (IRFA) on September 30, 1998. The Commission published an addendum to this notice in the Federal Register on August 14, 1999, which proposed a change in the testing protocol in response to a comment received on the NPR. The rule is being issued under the Consumer Product Safety Act (CPSA), and applies to manufacturers and importers of multi-purpose lighters, including micro-torches, sold in the U.S.

The Regulatory Flexibility Act (RFA) requires that when an agency issues a final rule it must prepare a final regulatory flexibility analysis (FRFA) describing the rule's impact on small entities. The FRFA must contain:

- (1) a succinct statement of the need for, and objectives of, the rule;
- (2) a summary of the significant issues raised by public comments in response to the initial regulatory flexibility analysis, a summary of the assessment of the agency of such issues, and a statement of any changes made in the proposed rule as a result of such comments;
- (3) a description of, and an estimate of the number of, the small entities to which the rule will apply or an explanation of why no such estimate is available;
- (4) a description of the projected reporting, recordkeeping, and other compliance requirements of the rule, including an estimate of the classes of small entities that will be subject to the requirement and a description of the type of professional skills necessary for preparation of the report or record; and
- (5) a description of the steps the agency has taken to minimize the significant economic impact on small entities consistent with the stated objectives of applicable statutes, including a statement of the factual, policy, and legal reasons for selecting the alternative adopted in the final rule and why each one of the other significant alternatives to the rule considered by the agency which affect the impact on small entities was rejected.

The Need for and Objectives of the Rule

The rule addresses the risk of death and injury from residential fires started by young children under the age of 5 playing with multi-purpose lighters. Since 1988, the Commission has identified 237 fires that were started by children under age 5 who were playing with multi-purpose lighters. These fires resulted in a total of 45 deaths and 103 injuries. Because these are only the incidents known to the CPSC, the actual numbers may be higher. Based on the available data for 1995 through 1998, the societal cost of these fires is at least \$48.6 million

annually.¹ Requiring that multi-purpose lighters be child-resistant, as defined in the rule, will significantly reduce the number of fires started by children under the age of 5.

Firms Subject to the Rule

The rule covers manufacturers and importers of multi-purpose lighters, including micro-torches, intended for sale to consumers. All firms that manufacture or import multi-purpose lighters will have to certify that their multi-purpose lighters are child-resistant. The firms will also be subject to the reporting and recordkeeping requirements in the rule.

The number of firms that manufacture or import these lighters is increasing. Approximately 40 firms have been identified, but there probably are other companies that have not been identified. Except for two manufacturers (one large and one small), all firms are believed to be importers rather than domestic manufacturers. Several of the importers are subsidiaries of larger firms or foreign manufacturers. Although the dominant firms are not small, as many as 20 of the remaining firms may be considered to be small businesses according to guidelines issued by the Small Business Administration (SBA).²

The small businesses that are most likely to be substantially impacted by the rule are those that have proprietary or exclusive rights to specific multi-purpose lighter models. These firms will likely have to bear the up-front costs of developing the child-resistant features, retooling, and costs. These costs could exceed \$100,000 even if few problems are encountered. The costs could be as high as \$2 million if problems are encountered, such as designs that infringe upon patents held by others or initial designs that fail the certification tests.

Of the small firms known to the Commission, seven have proprietary or exclusive rights to particular multi-purpose lighter models. One is already marketing a multi-purpose lighter that it believes to be child-resistant, although it has not been certified in accordance with the requirements of the rule. Two other small firms are believed to be actively developing child-resistant models. Thus, although the rule will impose costs on small firms, this burden is not insurmountable and some small firms with proprietary designs should be able to compete successfully after the rule goes into effect. However, some firms may decide that the added costs are too great and cease marketing their proprietary designs.

¹ Includes the costs associated with fatalities (\$43.8 million), non-fatal injuries (\$3.6 million) and property damage (\$1.2 million) annually.

² According to the published SBA guidelines (13 CFR 121.601), a manufacturer of multi-purpose lighters (SIC 3999) is small if it has fewer than 500 employees. An importer or wholesaler of multi-purpose lighters (SIC 5199) is small if it has fewer than 100 employees.

Many of the small businesses that market multi-purpose lighters and micro-torches do not have proprietary or exclusive rights to any multi-purpose lighter model. These companies either import or privately label lighters produced by other firms. The impact on these companies is not likely to be significant. The manufacturers or firms that own the designs will likely bear most of the research, development, retooling, and certification costs. Since these manufacturers often supply product to more than one importer or private labeler, the costs are likely spread over a higher production volume. Furthermore, even if a small importer or private labeler stopped importing or distributing multi-purpose lighters, it is not likely to suffer a significant adverse impact if multi-purpose lighters account for a small percentage of its total sales, as is thought to be the case with many of the importers.

Some small importers may experience some disruption in their supply of multi-purpose lighters if some of the foreign suppliers opt not to develop child-resistant multi-purpose lighters. However, the 12-month period between the publication of the final rule and its effective date should allow time for most importers to take action to ensure that they have a source for child-resistant multi-purpose lighters.

Issues Raised by the Public Comments on the IRFA

Several issues were raised in the public comments on the IRFA and the NPR. The issues raised and the CPSC staff's responses are discussed below.⁷

Requirement for multiple operations. One issue raised in the public comments on the NPR and the IRFA concerned the requirement that a consumer be able to operate the ignition mechanism multiple times before the child-resistant mechanism resets (unless one motion only is required to both disable the child-resistant mechanism and ignite the lighter). This requirement was added to the proposed rule to ensure that the rule would not increase the risk of serious injury from "flashback" fires or explosions. In response to the ANPR, some commenters had raised concern that a child-resistant mechanism may make multi-purpose lighters more difficult to light. The resulting delay in igniting the lighter may allow sufficient gas from a gas appliance to build up to a level where a "flashback" fire or explosion could result when the lighter was finally ignited. However, in response to the NPR, several of the same commenters pointed out that this requirement would have limited the universe of potential designs and would have added an additional obstacle to a firm attempting to develop a child-resistant multi-purpose lighter. For example, designs for child-resistant lighters that did not increase the risk of flashback hazard because of a high degree of lighting efficiency, but did not allow for multiple operations of the ignition mechanism would not have been allowed.

After reviewing the public comments, the Commission staff conducted more extensive research to determine the extent of the flashback hazard. The staff found insufficient evidence to

conclude that current multi-purpose lighters pose a risk of injury due to flashback, or that the addition of a child-resistant mechanism that resets after each operation would pose such a risk.³ Therefore, the requirement for multiple operations has been dropped from the final rule.

Free legal counsel and testing. One commenter suggested that CPSC offer free legal counsel and testing to small businesses with proprietary designs. CPSC does not have the ability to offer free or subsidized legal services to firms for the purposes of obtaining patents or pursuing litigation related to patents.

Mandate design standards. One commenter suggested that CPSC mandate specific design standards to which no manufacturer or importer would have intellectual property rights. This is not feasible because under the CPSA, a standard must be expressed in terms of performance, and not design, requirements. However, even if CPSC could mandate a design standard rather than a performance standard, it would not be in the public interest for it to do so. The ability to patent original designs gives manufacturers incentives to invest resources in developing better designs. This innovation benefits consumers since the new designs are often easier to use and/or have other advantages over the earlier designs. A mandated design would have the effect of stifling further innovation.

The experience with the cigarette lighter safety standard supports this position. After the original child-resistant cigarette lighters were introduced, some manufacturers came out with designs for child-resistant cigarette lighters that improved upon their earlier designs. Consumers benefited from this continued research because the later designs were generally easier to use, no more expensive, and still child-resistant.

Finally, we note that some companies, including some small manufacturers, have already invested resources in designing child-resistant multi-purpose lighters. Consequently, if CPSC now mandated a particular design standard, it could have an adverse economic impact on the firms that were taking the lead in developing new child-resistant designs.

Two-year effective date. One small manufacturer asked for a two-year effective date to give it time to evaluate the patents issued to other companies before commencing its own efforts to either develop new technology or license technology from others. The purpose for its request was its understanding that several other firms were actively pursuing patent applications for child-resistant technology and that it needed to see what these patents covered before beginning to work on its own technology.

³ CPSC memorandum from William Rowe (Mechanical Engineer, LSE) to Barbara J. Jacobson (Project Manager for Multi-Purpose Lighters), "Flashback Associated with Gas Grills," (July 1999).

CPSC staff does not believe that extending the time limit for small manufacturers to comply with the rule is an effective method for reducing the burden of the rule on small businesses. Several of the companies that are actively developing child-resistant technology are small firms. Therefore, such an exemption would only help some small firms at the expense of others, while doing nothing to protect the public from the unreasonable risk. Secondly, our experience with the cigarette lighter safety standard shows us that many firms are unlikely to stop working on child-resistant technology once they have developed a child-resistant design, but will continue to seek improvements in their designs. Furthermore, new firms may enter the market. Thus, a firm that is waiting for all other firms to introduce their designs before commencing its own development efforts may have to wait much more than a couple of years. In the meantime, if these small firms were allowed to continue to produce non-complying lighters, the effectiveness of the rule in reducing fires, injuries, and deaths would be reduced.

Cost of Testing. One small manufacturer claimed that the cost of the certification testing was exorbitant and would be a burden to small firms. This firm has already introduced a multi-purpose lighter that is designed to be child-resistant, but it has not been certified or tested.

The staff considered whether small firms could be exempted from meeting the testing requirements. The certification testing costs could average \$25,000 per model. However, the cost for any one firm may be different. The costs could be substantially lower if only one panel is required and the firm did not have to develop surrogates. The costs could be higher if more than one panel is required and the firm has to build surrogates for use in the testing.

The staff believes that conducting these tests is necessary to ensure that the lighter is child-resistant. The actual child-panel tests are a small part of the entire cost of designing and bringing a child-resistant lighter to market. If a manufacturer is confident that its design is child-resistant, it should also be confident that the cost of the certification testing will be on the low side of the estimated range of costs. Furthermore, the testing is a one-time cost. Once a design passes the certification test, it does not have to be tested again for child-resistance.

If certain small firms were exempted from the testing and one of their models was later found not to be child resistant, the cost to the manufacturer of a recall could exceed the cost of the testing. Moreover, if an exemption from testing was granted and a lighter was not in fact child-resistant, it could lead to hundreds of thousands or millions of non-child-resistant multi-purpose lighters being introduced into commerce. Just one additional child-play fire incident associated such a lighter could result in societal costs that greatly exceed the cost of the certification testing. Therefore, CPSC staff does not believe that it is in the public interest to exempt small firms from the testing requirements of the rule.

Reporting and Recordkeeping Requirements

All manufacturers and importers of multi-purpose lighters will be required to keep certain records regarding the certification testing and production (quality control) testing of their multi-purpose lighters. The preparation of the records should not require any professional or technical skills that would not typically be possessed by or available to a manufacturer or importer. For example, the production testing is very similar to the quality control testing that most manufacturers undertake routinely. There are also independent quality control and engineering laboratories and other professional consultants with which firms can contract for these services, if they do not have the expertise in-house.

In order to perform the certification tests, the manufacturers will have to supply at least 6 empty surrogates. Most manufacturers will probably be able to use empty production lighters for the surrogates (if the lighter makes an audible "click" when the ignition mechanism is operated properly). Other manufacturers may have to develop surrogates for use in the certification tests that produce an audible or audible and visual signal when the ignition mechanism is successfully operated. This may involve technical knowledge of miniature electronics that some small firms may not have in-house. However, there are independent engineering firms with this expertise with which small firms may contract.

Conducting the certification tests and preparing the supporting documentation does not require any special technical skill or extensive training. Manufacturers could conduct the conformance tests with in-house personnel, but it is likely that many will employ private consulting or testing services. The records of the testing would likely be compiled by the firm conducting the testing and maintained by the manufacturer or importer. Copies of other reports or certification records would also be maintained by the manufacturers or importers or their legal counsels.

The rule also allows importers to rely on testing by or for a foreign manufacturer to support the rule's certification and reporting requirements, provided that the records (1) are in English, (2) are complete, (3) can be provided to the Commission within a reasonable time period, if requested, and (4) provide reasonable assurance the multi-purpose lighters are child-resistant. This provision may reduce the testing burden on some small importers, since some manufacturers may supply lighters to more than one importer.

At least 30 days before it first imports or distributes a multi-purpose lighter model, the manufacturer or importer must provide written notice to the Consumer Product Safety Commission. Among other things, this report is to include basic identifying information as to the manufacturer or importer, a description of the lighter model and its child-resistance features, a description and summary of the certification testing, and the location where the other required

records will be kept. The manufacturer or importer must also supply the CPSC with a prototype or production unit of the lighter model.

The reporting requirements of the rule are necessary for the CPSC staff to monitor compliance. The staff is not aware of any method by which the reporting burden on small businesses could be reduced while still accomplishing the purpose of the rule. The estimated reporting burden, however, is low. We estimate it will be less than 100 hours per model in the initial production year (including the certification testing) and significantly less than this in subsequent years.

Assuming that approximately 20 manufacturers, with 1 to 2 models each, introduce child-resistant multi-purpose lighters during the first year after the publication of the final rule, the total paperwork and reporting burden for all manufacturers will be 2,000 to 4,000 hours. In subsequent years the total paperwork and reporting burdens should be significantly less. For example, if three new models are introduced annually, the total burden on society will be approximately 300 hours.

Other Alternatives Considered

In addition to the alternatives already discussed, the staff considered four basic alternatives to certain elements of the rule. Specifically, the staff considered (1) narrowing the scope to exclude high-end and/or micro-torch multi-purpose lighters, (2) requiring only additional labeling, (3) taking no action and relying on voluntary efforts, and (4) alternative effective dates.

Narrowing the Scope: The staff considered excluding high-end multi-purpose lighters, some of which retail for more than \$20, from coverage by the rule. The staff also considered excluding the micro-torch lighters from coverage.

Industry sources believe that the market share of the high-end multi-purpose lighters and micro-torches probably accounts for significantly less than five percent of the unit sales. There are 3 firms that are known to market high-end multi-purpose lighters; all 3 of these firms have fewer than 100 employees and are considered to be small businesses. (One firm claims that its multi-purpose lighter has features that should make it child-resistant.) Of the 6 firms that are known to distribute micro-torches, 3 have fewer than 100 employees and are considered to be small businesses.

While excluding the high-end multi-purpose lighters and/or micro-torch lighters from the scope of the rule might reduce the impact of the rule on some small businesses, the CPSC has no

evidence that these multi-purpose lighters are less likely to be involved in child-play fires than the less expensive models. Baseline testing indicates that some of the high-end models are at least as easy to operate as some less expensive models. And, there is no evidence that the high-end multi-purpose lighters and micro-torches are stored differently around the home than are the less expensive lighters. Therefore, the staff determined that the high-end multi-purpose lighters and micro-torches should be required to meet the same child-resistance standard as the less expensive ones.

Labeling Requirements: Although a labeling-only requirement would significantly reduce the burden of the rule on all firms, large and small, the staff did not believe that any additional labeling would have a significant impact on the incidence of child-play fires. Furthermore, all multi-purpose lighters are already labeled "Keep out of reach of children." Therefore, a labeling-only rule would not significantly reduce the risk of child-play fires associated with multi-purpose lighters.

Taking No Action or Relying on a Voluntary Standard: CPSC considered taking no action to reduce the occurrence of fires started by children playing with multi-purpose lighters. If no mandatory rule is issued, some manufacturers may still introduce child-resistant multi-purpose lighters. While these manufacturers can emphasize the safety of their product, they would be at a competitive price disadvantage compared to manufacturers who continued to sell non-child-resistant lighters. This would result in a lower level of benefits than would be obtained with the rule.

Although the portion of the market that would be captured by manufacturers of child-resistant lighters is not known, it is reasonable to assume it would be substantially less than 100 percent. Perhaps only 3 or 4 firms would offer such products. Thus, the benefits to society of taking no action or relying only on voluntary efforts would be lower than they would be under a mandatory rule.

There is no voluntary standard for child-resistant multi-purpose lighters, and no apparent industry interest in developing one. Although the Commission could work with appropriate standards-setting organizations to try to develop such a standard, it is not clear that an acceptable voluntary standard could be developed with sufficient speed, or that conformance would be adequate.

Alternative Effective Date: The rule incorporates an effective date of 12 months from the date of publication in the Federal Register. The 12-month effective date lessens the economic

burden of the rule, especially on small firms, while providing protection to consumers in a reasonably expeditious manner.

While developing the Cigarette Lighter Safety Standard the staff estimated that it would take an average of 12 months to develop, test, retool for production, perform production tests, and manufacture and ship the product.⁴ The results of the certification testing must be reported to CPSC at least 30 days in advance of the importation or distribution of the lighters. In addition, the time required for importing complying lighters into the United States will be a significant consideration for many firms. Some manufacturers, especially those that have been following this rulemaking proceeding, may have already begun developing child-resistant models. Manufacturers who have had experience with developing child-resistant cigarette lighters may be able to take advantage of their experience with the cigarette lighter standard and be able to manufacture and market child-resistant lighters sooner than 12 months. In fact, at least one model is already on the market and we are aware of other manufacturers that are working on child-resistant designs.

On the other hand, manufacturers who have not followed or only very recently started following the Commission's activity in this rulemaking procedure may not have begun any development work. Additionally, manufacturers that do not also produce cigarette lighters, such as some micro-torch manufacturers, do not have prior experience developing child-resistant designs. These manufacturers might be adversely affected by an effective date shorter than 12 months.

Summary and Conclusions

The rule will affect all manufacturers and importers of multi-purpose lighters, including a number of manufacturers and importers that are small businesses. The small firms that import or manufacture multi-purpose lighters will be impacted by the rule's performance, certification, recordkeeping, and reporting requirements. The higher costs of manufacturing child-resistant lighters incurred by their suppliers will likely be passed onto to these firms as well. Some of the firms may have temporary disruptions in their supply of multi-purpose lighters because of the rule. However, it is unlikely whether any of these effects would be significant.

In addition to the small importers, there are a few small firms that manufacture their own multi-purpose lighters or have their own proprietary designs manufactured for them. The rule may have a more significant impact on these firms since they will likely bear most of the cost of developing and certifying the child-resistant mechanisms for their multi-purpose lighters.

⁴CPSC Memorandum dated February 8, 1991, from Dale R. Ray (ECPA) to Barbara Jacobson (HS).

Some alternatives to the rule were considered that might have reduced the burden on small manufacturers. However, these alternatives were rejected as the level of safety that would be achieved was lower under these alternatives than under the rule. These alternatives included taking no action, requiring additional labeling only, extending the proposed effective date, and exempting the high-end multi-purpose lighters from the scope of the rule .

**Multi-Purpose Lighters:
Final Regulatory Analysis
November 18, 1999**

**Robert Franklin
Directorate for Economic Analysis
U.S. Consumer Product Safety Commission**

Contents

Executive Summary.....	ii
Introduction.....	1
Requirements of the Rule.....	3
Product and Market Information.....	4
The product	
Sales, retail prices and useful product life	
Manufacturers	
Substitutes for multi-purpose lighters	
Regulatory Analysis.....	8
Potential Benefits of the Rule.....	8
Societal costs of child-play fires	
Deaths	
Injuries	
Property Damage	
Total Societal Costs	
Expected reduction in societal costs	
Potential Costs of the Rule.....	11
Manufacturing Cost	
Research and Development Costs	
Material and Labor Costs	
Certification and Testing Costs	
Administrative Costs	
Total Manufacturing Costs	
Net Benefits.....	15
Other Impacts of the Rule.....	15
Stockpiling	
Effects on Competition and International Trade	
Impact on Small Business	
Impact on Utility to the Consumer	
Alternatives Considered to the Rule.....	17
No Action/Rely on Voluntary Efforts	
Labeling Requirements	
Narrowing the Scope	
Alternative Effective Date	
Alternatives to Reduce the Burden on Small Businesses	
Environmental Assessment.....	21
Conclusion.....	22

Executive Summary

Multi-purpose lighters are commonly used to light charcoal and gas grills, pilot lights, camping stoves, candles and similar objects. Most use butane as fuel, which is ignited by a piezo crystal. Micro-torch lighters, a type of multi-purpose lighter, also have applications in activities such as soldering, bending plastics, and heat shrinking.

As of 1999, an estimated 21 million multi-purpose lighters (including micro-torch lighters) are being sold annually. Although sales have been increasing at a rate of over 5 percent annually, some in the industry believe that the rate of increase in sales may slow over the next few years. There are about 20 manufacturers and as many as 20 or more additional firms that import or privately label multi-purpose lighters.

There is at least one model currently on the market that is child-resistant; several other companies are actively developing child-resistant models.

The retail prices of multi-purpose lighters have fallen significantly over the last couple of years. Retail prices start at less than \$2.50 and most are less than \$6.00. However, some more expensive models retail for more than \$20.00.

Based on available data, the societal costs of fires (deaths, injuries and property damage) resulting from children under the age of 5 playing with multi-purpose lighters (including micro-torches) is about \$48.6 million annually, or approximately \$2.43 for each multi-purpose lighter in use. A rule is expected to reduce such fires by at least 75 percent, resulting in a gross benefit (reduction of societal costs) of \$1.82 per multi-purpose lighter per year.

Manufacturers will incur costs to comply with the requirements of the rule. The costs to manufacturers of designing, testing, retooling, and producing child-resistant multi-purpose lighters is expected to be about \$0.48 per unit for most types of multi-purpose lighters. The retail prices of most multi-purpose lighters may increase by about \$0.96 per unit as a result of the rule. The per-unit costs will likely be higher for other types of multi-purpose lighters, such as micro-torches.

The rule is expected to produce a net societal benefit (total societal benefits less total societal costs) of \$0.86 per lighter. Based on an estimate of 20 million lighters in use annually, this should result in an annual net benefit of at least \$17.2 million. This estimate may underestimate the actual benefits because it is based only upon fire incidents known to the CPSC rather than on national fire estimates. The actual number of fire incidents is likely to be higher.

Compliance with the rule is expected to result in net benefits to society. Alternative actions the Commission could take include: (1) taking no action and relying on voluntary efforts

to reduce child-play fires, (2) establishing labeling requirements, and (3) narrowing the scope of the rule. However, these alternatives would not increase net benefits and would result in a lower level of consumer safety.

Introduction

The U.S. Consumer Product Safety Commission ("CPSC" or the "Commission") is considering whether to issue a final rule to address the risk of residential fires started by children under the age of 5 years playing with multi-purpose lighters (hereafter called the "rule"). A multi-purpose lighter is a hand-held, manually-operated, flame-producing, portable device with a fuel source that is commonly used to ignite another fuel or other object, such as gas and charcoal grills, stoves, fireplaces, pilot lights, camping stoves, range burners, candles, and other things. The rule does not cover matches, nor does the rule cover lighters intended primarily to ignite tobacco products, which may be subject to the requirements of the Safety Standard for Cigarette Lighters, 16 CFR 1210.

The CPSC is aware of 196 fires caused by children under age 5 playing with multi-purpose lighters including micro-torches, a type of multi-purpose lighter, that occurred in the four-year period from 1995 to 1998.¹ These fires resulted in 35 deaths and 81 injuries (See Table 1). Because these are only the incidents known to CPSC, the actual number of incidents is likely to be higher.

The CPSC was petitioned in February 1996 to amend the safety standard for cigarette lighters (16 CFR 1210) to include the Scripto Aim 'n Flame disposable butane lighter within the scope of that standard. The Commission published an advance notice of proposed rulemaking (ANPR) on January 16, 1997. After reviewing the comments submitted in response to the ANPR, the Commission issued a notice of proposed rulemaking (NPR) in the Federal Register on September 30, 1998. An amendment to the NPR was published in the Federal Register on August 4, 1999. The rule proposed by the Commission would cover all multi-purpose lighters as defined in the rule. This includes the Scripto Aim 'n Flame, as well as other multi-purpose lighters and micro-torches that are not covered by the Cigarette Lighter Safety Standard.

If the Commission issues the final rule, it will be published under the authority of the Consumer Product Safety Act ("CPSA"), 15 U.S.C. 2051-2084. Before issuing a final rule, the CPSA requires the Commission to consider and make appropriate findings with respect to:

- (A) the degree and nature of the risk of injury the rule is designed to eliminate or reduce;
- (B) the approximate number of consumer products, or types or classes thereof, subject to such rule;

¹The analysis is limited to this 4-year period because the data available for other years are less complete.

- (C) the need of the public for the consumer products subject to such rule, and the probable effect of such rule, upon the utility, cost, or availability of such products to meet such need; and
- (D) any means of achieving the objective of the order while minimizing adverse effects on competition or disruption or dislocation of manufacturing and other commercial practices consistent with the public health and safety

15 U.S.C. 2058(f)(1).

Based on these findings, the Commission must, if it issues a final rule, publish a final regulatory analysis containing:

- (A) a description of the potential benefits and the potential costs of the rule, including costs and benefits that cannot be quantified in monetary terms, and the identification of those likely to receive the benefits and bear the costs;
- (B) a description of any alternatives to the final rule which were considered by the Commission, together with a summary description of their potential benefits and costs and a brief explanation of the reasons why these alternatives were not chosen; and
- (C) a summary of any significant issues raised by the comments submitted during the public comment period in response to the preliminary regulatory analysis, and a summary of the assessment by the Commission of such issues

15 U.S.C. 2058(f)(2).

The CPSA also requires the Commission to make the following findings before it promulgates a rule:

- (A) that the rule (including its effective date) is reasonably necessary to eliminate or reduce an unreasonable risk of injury associated with such product;
- (B) that the promulgation of the rule is in the public interest;
- (C) that the benefits expected from the rule bear a reasonable relationship to its costs; and
- (D) that the rule imposes the least burdensome requirement that prevents or adequately reduces the risk of injury for which the rule is being promulgated

15 U.S.C. 2058(f)(3).

This report presents the staff's final regulatory analysis of the rule on multi-purpose lighters, and provides a summary of the information necessary to make the above findings.

The Commission is also required by the National Environmental Policy Act of 1969 (NEPA) to consider potential environmental impacts of any rule. This report contains an environmental impact review.

Requirements of the Rule

The rule addresses the risk of death and injury caused by children under the age of 5 playing with multi-purpose lighters, including micro-torches. Manufacturers or importers of products meeting the definition of "multi-purpose lighters" would have to certify that their products comply with the rule and provide evidence of a reasonable testing program, as required by 15 U.S.C. 2063, to support the certification. The rule specifies minimum requirements and features of the required testing program.

The test protocol is intended to determine the percentage of children in a specified age range that could be expected to be able to operate the lighter. It requires surrogates that will not produce a flame be used in the tests in place of production lighters.² Up to two panels of 100 children are used to test the surrogates. If a child succeeds in operating a surrogate, an audible or visual and audible signal is produced. If at least 85 percent of the children in the test panels are unable to operate the surrogates, the production lighters comply with the child-resistance requirements.³

The rule would also establish certain minimum recordkeeping and reporting obligations for manufacturers, importers, and distributors. The effective date of the rule is one year after the date of its publication in the Federal Register. All multi-purpose lighters manufactured in the U.S. or imported after that date will have to comply with the requirements of the rule.

²A production lighter without fuel may be used in the testing if the lighter has an audible signal, such as a click, that occurs when it has been operated successfully.

³ A second 100-child panel is not required if less than 11 children in the first panel could operate the surrogates.

Product and Market Information

The Product

Multi-purpose lighters are used around the home for lighting barbecue grills, other gas appliances, pilot lights, candles, camping equipment, and other products. Micro-torches, a specific type of multi-purpose lighter, also have applications in soldering, bending plastics, heat shrinking, various types of repair work, and crafts. However, micro-torches that are intended primarily for igniting cigars or other smoking materials (often called "cigar torches") may be subject to the Cigarette Lighter Safety Standard (16 CFR 1210) and may not be subject to the multi-purpose lighter rule.

Most multi-purpose lighters have an extended nozzle from which the flame is emitted. The nozzle is typically four to eight inches in length, but can be longer or shorter. Most micro-torches do not have extended nozzles, but have relatively long, thin, and steady flames that can be directed to their targets. Most multi-purpose lighters use butane fuel. The more expensive multi-purpose lighters are refillable. Many of the less expensive Asian imports are also refillable.

Multi-purpose lighters are operated by applying pressure to a trigger, button, or sliding mechanism. This action releases the fuel and activates a spark at the end of the nozzle that ignites the fuel. Because the fuel must travel from the reservoir, usually located in the handle, to the end of the nozzle, the spark is sometimes activated before the fuel reaches the end of the nozzle. When this happens, the fuel will not be ignited. Users of multi-purpose lighters sometimes have to make more than one ignition attempt before successfully producing a flame. Some higher-priced multi-purpose lighters overcome this problem by using a battery that causes a spark to be continuously generated. This problem is less noticeable in micro-torch lighters.

Sales, Retail Prices and Useful Product Life

Both multi-purpose lighters and micro-torches were introduced around 1985. Sales of multi-purpose lighters increased rapidly after their introduction. Scripto-Tokai, the firm that introduced multi-purpose lighters, reports that it sold one million units the first year. Industry sources estimate that sales of multi-purpose lighters were about 20 million units in 1998 and will be approximately 21 million units in 1999. Industry sources are divided over their expectations for future sales. Some expect sales to continue to increase at the rate of 5 to 10 percent annually over the next several years. Others believe that the market for multi-purpose lighters is becoming satiated and that sales are likely to increase at a slower pace than in the past.

Retail prices of multi-purpose lighters have declined over the last few years. Currently, retail prices for multi-purpose lighters start at less than \$2.50, and most sell for less than \$6.00.

However, some high-end multi-purpose lighters retail for \$20 to \$40 or more. Micro-torches have been observed retailing for as little as \$12, but they more frequently retail for around \$20 to more than \$100. Micro-torches and other high-end multi-purpose lighters combined probably have less than five percent of the market for multi-purpose lighters.

The useful life of a multi-purpose lighter depends on how often it is used and on the purpose for which it is used. If a typical multi-purpose lighter contains enough fuel for an average of 1,000 lights⁴, a multi-purpose lighter that is used several times a day would be expected to last less than one year. On the other hand, a lighter that is used less than once a day, or only seasonally, could last longer. The fuel supply is not the only thing that limits the useful life of a multi-purpose lighter. A multi-purpose lighter can break or wear out, the piezo crystals can become dirty or misaligned, the fuel lines can become clogged, and the O-rings may fail and allow fuel to leak out of the lighter. Since most multi-purpose lighters are relatively inexpensive, some may simply be misplaced by consumers.

According to industry sources, more than 18 million lighters were sold in 1997. At the same time, a study based on a panel of 20,000 households indicated that fewer than 8 million U.S. households purchased multi-purpose lighters between October 1996 and October 1997.⁵ This suggests that most multi-purpose lighters have a useful life of less than one year, and/or that a large proportion of households that have multi-purpose lighters use more than one lighter over the course of a year.

The useful life of the more expensive models and micro-torches can be longer. These lighters are refillable and retail for \$20 to more than \$100. Although the unit sales of the more expensive lighters account for only a small portion of the annual sales of multi-purpose lighters,⁶ because of their longer expected life, the number in use at any given time is likely to be somewhat higher than their share of the annual sales.

⁴What constitutes an "average" light is less certain than with cigarette lighters, where the average time to light a cigarette is fairly predictable. While using a multi-purpose lighter to light a single candle may require little time (and fuel), lighting a gas grill may require more time. The multi-purpose lighter would first have to be lit, the gas for the grill turned on, and then the gas would have to build up to the level where it is ignited.

⁵Information Resources Inc. study. Results provided by BIC Corporation.

⁶The number of high-end multi-purpose lighters and micro-torches sold annually is not known with any precision. However, industry sources have indicated that the sales of these items are "in the thousands rather than the millions."

Based on the assumption that the average useful life of multi-purpose lighters is approximately one year or less, we estimate that the number of multi-purpose lighters used during a given year is roughly equal to the estimated annual sales. Thus, in the period 1995 through 1998, the number of multi-purpose lighters in use in a given year was probably in the range of 16 million to 20 million.⁷

Manufacturers

CPSC staff has identified about 40 firms that manufacture, import, or privately label multi-purpose lighters. There are likely other firms, especially small importers or private labelers, that have not been identified. The number of firms participating in the market has increased as sales have increased.

Four manufacturers (Scripto-Tokai, BIC, Ronson, and Swedish Match) are members of the Lighter Association Inc., a trade association representing manufacturers of cigarette lighters. In 1997, the Lighter Association estimated that its members had more than 90 percent of the market for multi-purpose lighters in the United States. However, the market share of the Lighter Association members appears to be declining as competition from Asian and other imports is increasing.

The manufacturer with the largest market share is Scripto-Tokai Corporation. Although Scripto once had over 90 percent of the market, industry sources indicate that its share has fallen, and probably is now in the range of 80 to 90 percent. Most of the remaining 10 to 20 percent are manufactured by companies such as BIC, Swedish Match, Ronson, and various Asian manufacturers.

BIC Corporation manufactures its multi-purpose lighter at a facility in South Carolina. Only one other manufacturer, Donel, a manufacturer of high-end lighters, is known to produce multi-purpose lighters domestically. Scripto-Tokai imports its lighters from Mexico. Flamagas (Clipper brand) lighters are produced in Spain. Most other lighters are manufactured in Asia.

There appears to be little overlap between the manufacturers and importers of micro-torches and the manufacturers and importers of the other types of multi-purpose lighters. Most micro-torches are imported from Asian countries, especially Japan, Taiwan, and China. Two Taiwan-based manufacturers that are known to supply micro-torches for import to the United States are Pro-Iroda, Inc., and Fu Ruey Enterprises. Major importers of micro-torches include Blazer Corporation and Master Appliance.

⁷ Based on estimates of sales from industry sources.

There are a handful of small U.S.-based companies that have proprietary designs for multi-purpose lighters. These companies generally work with Asia-based manufacturers to manufacture their products. However, the U.S.-based companies have often borne the research and development costs. Other small U.S.-based companies are known to import and privately label multi-purpose lighters for which they do not hold proprietary designs.

Substitutes for Multi-Purpose Lighters

There are a number of substitutes for multi-purpose lighters. The most likely and versatile substitute is probably ordinary box or book matches. Compared with about 8 million households purchasing multi-purpose lighters in 1997, a 1991 study for the CPSC indicated that more than 60 million households had matches (either book or box matches). Cigarette lighters can also be used for many of the purposes for which multi-purpose lighters are used. The retail prices of the substitutes are reasonably close to the retail prices of multi-purpose lighters.⁸ However, since sales of multi-purpose lighters have climbed rapidly from approximately 1 million units in 1985 to 20 million in 1998, we can infer that some consumers perceive that they receive greater utility from multi-purpose lighters than they would from the substitutes in some applications.

There are also reasonable substitutes for micro-torches when they are used in applications such as soldering. The closest substitutes would likely be butane or propane torches that do not have internal ignition mechanisms. These are functionally nearly identical to micro-torches when used for torch applications, except that they must be ignited with a match or other external lighter. Electric soldering irons can also be used for many of the same applications. The cost to consumers of these substitutes may be reasonably similar to the cost of micro-torches.

⁸If the retail price of a multi-purpose lighter is \$2.50, then \$2.50/1,000 lights is \$0.0025/light. If the retail price of a multi-purpose lighter is \$6.00, then \$6.00/1,000 lights is \$0.006/light. Based on retail prices observed in the Washington, DC area, 750 box matches sold for \$2.05, or \$0.0027 each. Other types of matches, such as book matches, cost less per light. The cost per light of cigarette lighters is about 0.1 cents.

Regulatory Analysis

Potential Benefits of the Rule

Societal Costs of Child-Play Fires

The rule is intended to reduce fires resulting from children under the age of 5 playing with multi-purpose lighters. The benefits to society of the rule will be the expected reduction in the societal costs of the deaths, injuries, and property damage associated with these fires.

The Commission is aware of 196 fires from 1995 through 1998 started by children under age 5 playing with multi-purpose lighters. These incidents, which are summarized in Table 1, resulted in 35 deaths, 81 injuries, and substantial property damage. The societal costs of these fires are discussed below. The analysis is limited to this 4-year period because the data available for other years are less complete.

Deaths: If we assume a cost of \$5 million for each fatality, an estimate that is consistent with the existing literature,⁹ a point estimate of the societal costs of the known fatalities between 1995 and 1998 is \$175 million.

Injuries: Many of the 81 non-fatal injuries were severe. At least 43 involved burn injuries. Fire burns are among the most costly of injuries in terms of the cost of medical treatment and the pain and suffering of the victim. A CPSC study estimated that the average cost of a hospitalized

Table 1. Known Child-play Fires Associated with Multi-Purpose Lighters

Year	1995	1996	1997	1998	Total
Fires	17	57	49	73	196
Deaths	6	8	4	17	35
Injuries	8	32	8	33	81

fire burn injury was \$898,000; the average cost of a burn injury where the victim was treated and released was estimated to be \$15,000; and the average cost of a burn injury treated elsewhere was \$2,000.¹⁰ These costs include medical and transportation costs, lost productivity, and pain and suffering. Of the 43 burn injuries, at least 15 were hospitalized and 12 were treated and released. The remaining 16 burn victims were either treated at the scene or the treatment they received is unknown. Based on the average societal costs from these types of injuries, the total cost of the

⁹See Viscusi, W. Kip, "The Value of Risks to Life and Health," The Journal of Economic Literature, v. 31 n. 4 (1993).

¹⁰Ray, Dale R. and William W. Zamula, Societal Costs of Cigarette Fires. U. S. Consumer Product Safety Commission, August 1993.

burn injuries known to have occurred during this period is estimated to be at least \$13.7 million ($15 \times \$898,000 + 12 \times \$15,000 + 16 \times \$2,000$).

At least 20 of the 81 injuries involved smoke inhalation. The CPSC study referenced above estimated that the average societal cost of a smoke inhalation injury was about \$130,000 if the victim was hospitalized and \$13,000 if the victim was treated and released. If the victim were treated at the scene or received other treatment, the average societal cost was estimated to be \$2,000. One of the smoke inhalation victims was hospitalized and 12 were treated and released. If we assume that the remaining 7 victims were treated at the scene, the total societal costs associated with the smoke inhalation cases are estimated to be about \$0.3 million ($1 \times \$130,000 + 12 \times \$13,000 + 7 \times \$2,000$).

The remaining 18 victims either had other types of injuries, such as broken bones or lacerations, or the type of injury was not reported. The treatment received by these victims is either unknown or not reported. The above referenced CPSC study estimated the average societal costs of other non-hospitalized injuries to be \$13,000. Therefore, the total societal costs of the 18 victims who had injuries other than burns or smoke inhalations can be estimated at \$0.2 million ($18 \times \$13,000$).

Based on the above discussions, we estimate that the total societal costs of the injuries associated with children playing with multi-purpose lighters that we know to have occurred during the 1995 through 1998 period to be \$14.2 million.¹¹ This is a conservative estimate since it includes only the incidents of which CPSC staff is aware.

Property Damage: The total property damages from the 196 child-play fires known to have occurred from 1995 through 1998 exceeded \$5 million. This number is conservative because it only includes the fires known to CPSC. And, of those known fires, it only includes fires where a property damage estimate was reported to CPSC.

Total Societal Costs: Summarizing all of the above costs (deaths, injuries, and property damage), the total estimated societal costs of the known incidents for the four-year period 1995 through 1998 is about \$194.2 million, or \$48.6 million annually. This comes to about \$2.43 for each multi-purpose lighter in use. It is important to note that these cost estimates are based only on the incidents reported to CPSC, not on national fire loss estimates. There are likely to be other incidents of which CPSC is not aware.

¹¹Based on \$13.7 million for burn injuries, \$0.3 million for smoke inhalation injuries, and \$0.2 million for all other injuries.

Expected Reduction in Societal Costs

The rule is not expected to eliminate all fire incidents involving children under the age of 5. Some children will be able to operate multi-purpose lighters that meet the requirements of the rule. Indeed, a multi-purpose lighter will meet the requirements of the rule provided that no more than 15 percent of the subjects in the test panels can operate the lighter.

On the other hand, some children under the age of 5 cannot operate the non-child-resistant multi-purpose lighters currently on the market. CPSC baseline testing indicates that, depending on the model, 4 to 41 percent of test subjects cannot operate non-child-resistant multi-purpose lighters.¹² Therefore, all other things equal, the rule for multi-purpose lighters is expected to reduce the number of children under the age of 5 that can operate multi-purpose lighters by 75 to 84 percent.¹³

Additionally, it is important to note that the overall effectiveness of the standard may be higher than the 75 to 84 percent estimated above for two reasons. First, manufacturers may achieve a level of child-resistance greater than 85 percent to ensure that their designs will achieve at least the minimum level of child resistance required by the rule. The experience with cigarette lighters, for example, indicates that most manufacturers achieve 90 percent or higher child resistance.

Second, CPSC probably over-estimated the baseline child-resistance of the non-child-resistant multi-purpose lighters in use. This is because CPSC tested lighters with ON/OFF switches in the OFF or "locked" position. If the lighter had been tested with the switch in the ON or "unlocked" position, the baseline child-resistance would have been much lower than the 41 percent estimated above.¹⁴ We expect that some multi-purpose lighters will at times be stored with the switch in the UNLOCKED position.

¹²CPSC did not conduct baseline testing on micro-torches. This analysis assumes that the child-resistance of micro-torches is similar to that of other multi-purpose lighters.

¹³For lighters that already have a high baseline child resistance (e.g., could not be operated by 41 percent of the test subjects, the improvement will be 75 percent $[(0.85-0.41)/(1.0-.41)=0.75]$. For lighters that do not have a high degree of baseline child resistance (e.g., could not be operated by only 4 percent of the test subjects, the improvement will be 84 percent $[(.85-.04)/(1-.04)=.84]$. Thus, the lower the baseline resistance, the greater the effectiveness of the standard.

¹⁴ CPSC tested one model with the switch in both the locked and the unlocked position. The child-resistance level was significantly lower in the tests when the surrogate was given to the children in the unlocked position (child-resistance of 12 percent in the unlocked position vs. 41 percent in the locked position). The child-resistance level of the one multi-purpose lighter tested that did not have an ON/OFF switch had a child-resistance level of only 4 percent.

Using the lower end of the range of the estimated effectiveness of the rule, during the 1995 through 1998 time frame, societal costs of child-play fires involving multi-purpose lighters would have been reduced by about \$36.5 million annually¹⁵ had all multi-purpose lighters been child-resistant. Assuming that an average of 20 million multi-purpose lighters were used each year, the gross benefit per lighter would have been about \$1.82. If there were child-play fires involving multi-purpose lighters during this period of which CPSC is not aware, or if a substantial number of consumers store multi-purpose lighters unlocked, the expected benefits would have been higher.

Potential Costs of the Proposed Rule

Manufacturing Costs

Manufacturers will incur costs to modify their products to comply with the rule. In general, costs that would be incurred by the manufacturers in developing, producing, and selling new complying lighters include the following:

- Research and development toward finding the most promising approaches to improving child resistance, including building prototypes and surrogate lighters for preliminary child-panel testing;
- Retooling and other production equipment changes required to produce child-resistant multi-purpose lighters, beyond normal periodic changes made to the plant and equipment;
- Labor and material costs of the additional assembly steps, or modification of assembly steps, in the manufacturing process;
- The additional labeling, recordkeeping, certification, testing, and reporting that will be required for each model.
- Various administrative costs of compliance, such as legal support and executive time spent at related meetings and activities; and
- Lost revenue if the child-resistant features adversely affect sales.

¹⁵From the \$48.6 million in annual societal costs estimated above, multiplied by .75 (the expected reduction in such fires).

Industry sources have not provided firm estimates of these costs. However, the Lighter Association stated that its members believed the costs would average between \$0.25 and \$0.75 per lighter. One major manufacturer, BIC, has introduced a child-resistant multi-purpose lighter. However, because BIC previously did not manufacture a non-child-resistant lighter, a spokesman was unable to estimate the incremental cost of developing and manufacturing child-resistant multi-purpose lighters.

Research and Development Costs

One manufacturer speculated that the costs of developing, testing, and retooling for production of multi-purpose lighters might be \$1 million per manufacturer, if it is possible to adapt the same technology used to make cigarette lighters child-resistant. However, if it were not possible to adapt the cigarette lighter technology, the costs could be as high as \$5 million per manufacturer. Two other manufacturers provided somewhat lower estimates of the costs. They expected to spend \$100,000 to \$1 million. However, they stressed that these were guesses and that unforeseen problems, such as problems stemming from patents owned by others, could increase the costs.

Although it is conceivable that some manufacturers will spend as much as \$5 million to develop child-resistant designs and retool for production, it seems likely that the average investment in research, development and retooling is likely to be no more than \$2 million. This estimate, which is somewhat higher than the \$1 million estimate that was used in evaluating the Cigarette Lighter Safety Standard, was used in the Preliminary Regulatory Analysis. No public comments were received that suggested that this figure was unrealistic.

If we assume that there are 20 manufacturers of multi-purpose lighters and that research and development costs are as high as \$2 million per manufacturer,¹⁶ then the total industry-wide research, development, and retooling costs will be about \$40 million. Assuming that these costs are amortized over 10 years and that sales increase at an annual rate of one percent,¹⁷ from a base of 21 million units in 1999, then the research, development and retooling costs will average about \$0.23/unit.¹⁸ For a manufacturer with a large market share (i.e., selling several million units annually) the cost per unit for research, development and retooling may be significantly lower

¹⁶Of the approximately 40 firms that are known to manufacture, import, or privately label multi-purpose lighters (including micro-torches), fewer than 20 are known to be actual manufacturers or to have proprietary designs. The other firms either import or privately label product manufactured by other firms.

¹⁷The approximate annual rate of population growth since 1990.

¹⁸Assuming one-percent annual growth in sales, the total sales over 10 years will be approximately 220 million. And, assuming an interest rate of 5 percent, the total costs to be amortized comes to \$50.2 million. \$50.2 million/220 million units = \$0.23/unit.

than this. On the other hand, for manufacturers with a small market share, such as the manufacturers of high-end lighters and micro-torch lighters, the per-unit development costs could be substantially greater since these costs would be amortized over a significantly lower production volume. However, the information available to us is insufficient to provide a reliable estimate of the cost per unit for the higher end and micro-torch-type lighters.

Material and Labor Costs

In addition to the research, development, and retooling costs, material and labor costs are likely to increase. For example, additional labor will be required to add the child-resistant mechanism to the lighter during assembly. Additional materials may also be needed to produce the child-resistant mechanism. While we were unable to get reliable estimates, some industry sources indicated that these costs would be low, probably less than \$0.25 per unit.

Multi-purpose lighters will also be required to have a label that identifies the manufacturer and the approximate date of manufacture. However, virtually all products are already labeled in some way. Since the requirement in the rule allows substantial flexibility to the manufacturer for things such as color, size, and location, this requirement is not expected to increase the costs significantly.

Certification and Testing Costs

Certification and testing costs include the costs of producing the surrogates needed in the testing, conducting the child-panel tests, and issuing and maintaining records for each model. These costs could average \$25,000 per model. However, the cost for any individual firm may be different. The cost for conducting child-panel tests for one model could be substantially lower if only one panel is required. The cost could be higher if the manufacturer must use a second panel or redesign a model that failed the initial test. The cost of designing surrogates could range from virtually nothing (if the production lighter has an audible signal, such as a click, that occurs when it has been operated successfully) to several thousand dollars (if surrogates must be designed and built). These costs are incurred only once, and would therefore, be amortized over the entire production of the model. Based upon the estimates described above, the amortized certification and testing are expected to average less than one cent per unit. However, for models with small market shares, the cost per unit for certification and testing may be higher.

Administrative Costs

There may be some additional and ongoing administrative expenses associated with compliance and related activities. While these expenses are difficult to quantify, they will probably be slight and have little impact on the unit costs.

Multi-purpose lighters are sold in countries other than the United States. Some manufacturers may develop lighters that meet the requirements of the rule for distribution in the United States, but continue to distribute the current, non-child-resistant models in other countries. Thus, some manufacturers may incur the incremental costs associated with producing multiple lines of similar products. These costs could include extra administrative costs required to maintain different lines and the incremental costs of producing different lines of similar products, such as using different molds or different assembly steps. These costs would be mitigated if other countries adopted similar standards.

Total Manufacturing Costs

In total, the rule will likely increase the cost of manufacturing multi-purpose lighters by about \$0.48 per unit.¹⁹ This estimate is in the \$0.25 to \$0.75 per unit range provided by the Lighter Association in response to the ANPR. The low end of the range provided by the Lighter Association may be more accurate if the additional material and labor costs are significantly less than estimated above.

The increased cost of manufacturing multi-purpose lighters will, for the most part, ultimately be borne by consumers. Generally, the increased cost of production will be passed on to the consumer in the form of higher prices. Assuming a 100 percent markup over the incremental cost to manufacturers (estimated at \$0.48/unit) the rule may be expected to increase the retail price of multi-purpose lighters by \$0.96 per unit. However, some manufacturers may be unable to pass all of the incremental costs directly to the consumers. This may be especially true in the case of the up-front research and development costs. In these cases the costs may be indirectly borne by consumers in such forms as generally higher prices on the range of products produced by the manufacturer. Individuals with equity interests in the firms may experience reduced earnings on investments in the company. The retail prices for high-end and micro-torch multi-purpose lighters will probably increase by more than \$0.96 per unit, since their costs per unit are greater.

¹⁹This estimate is based on the following estimates: \$0.23/unit for research, development and retooling and \$.25/unit for labor and materials.

Net Benefits

As previously discussed, the rule is expected to produce a gross societal benefit of \$1.82 per lighter and to increase the cost to consumers by about \$0.96 per unit. Therefore, the expected net benefit of the rule is \$0.86 per multi-purpose lighter sold ($\$1.82 - \0.96). Since annual sales of multi-purpose lighters exceed 20 million units, the rule should result net societal benefits of at least 17.2 million annually ($\$0.86 \times 20 \text{ million} = \17.2 million). As discussed previously, the actual net benefits may differ from the estimates if some of the assumptions used in computing the estimates prove inaccurate.

Other Impacts of the Rule

Stockpiling

The rule contains anti-stockpiling provisions, authorized by section 9(g)(2) of the CPSA, to prohibit excessive production or importation of non-complying lighters during the 12-month period between the publication date and the effective date of the rule. The provision would limit the production or importation of non-complying products to 120 percent of the amount produced or imported in the most recent calendar year before the issuance of the final rule. While the anti-stockpiling provision should have little impact on the market as a whole, it may adversely impact any small importers or manufacturers that were just entering the market. Such firms may have had low sales volume in their first year or two of operation, and thus their base volume would be low. In the absence of the anti-stockpiling provisions, they may have been able to increase their sales volume by a greater proportion than would be allowed under the anti-stockpiling provision. There is no limit on the number of *child-resistant* multi-purpose lighters that may be imported, manufactured, or sold during this period.

Effects on Competition and International Trade

The rule is not likely to have a significant adverse impact on competition. Scripto-Tokai Corporation introduced multi-purpose lighters in 1985 and for many years maintained a market share of 90 percent or more. Although Scripto-Tokai is still the dominant manufacturer, its market share has dropped in the face of increased competition from other manufacturers and importers. BIC has already introduced a multi-purpose lighter that meets the requirements of the rule. Moreover, the Commission is aware of several other manufacturers, including some small firms that are actively developing child-resistant multi-purpose lighters. These multi-purpose lighters are expected to be on the market by the time the rule becomes effective.

Impact on Small Business

CPSC has identified about 40 manufacturers, importers, and private labelers of multi-purpose lighters. Although the dominant firms are not small, many of the remaining firms are considered to be small businesses according to guidelines established by the Small Business Administration (SBA).²⁰ The rule may have a significant impact on some of the small firms.

The small businesses that are most likely to be impacted by the rule are those that market multi-purpose lighters to which they have proprietary or exclusive rights. These firms will likely have to bear the up-front costs of developing the child-resistant features as well as the retooling and certification costs. These costs could exceed \$100,000 even if few problems are encountered. If problems are encountered (e.g., designs that infringe upon patents held by others or initial designs that fail the certification tests) the costs could exceed \$2 million.

Of the small firms known to the Commission, seven have proprietary or exclusive rights to particular multi-purpose lighter models. Some of these firms are actively developing child-resistant models, and one is already marketing a multi-purpose lighter that it believes to be child-resistant (although it has not been tested). Thus the added burden is not insurmountable by small firms. However, other small firms may decide that the added costs are too great and cease marketing their proprietary designs.

Some small businesses market multi-purpose lighters and micro-torches to which they do not have proprietary or exclusive rights. These companies either import or privately label lighters produced by other firms. In these cases, the manufacturer or firm that owns the design will likely bear most of the research, development, retooling, and certification costs. Since these manufacturers often supply product to more than one importer or private labeler, the costs are likely spread over a higher production volume. Moreover, multi-purpose lighters usually account for only a small percentage of many of the importers' and private labelers' sales. Therefore, even if a small importer or private labeler stopped importing or distributing multi-purpose lighters, it is not likely to suffer a significant adverse effect if multi-purpose lighters account for a small percentage of its total sales.

Impact on Utility to the Consumer

The rule may reduce the utility that consumers receive from multi-purpose lighters if child-resistant multi-purpose lighters are more difficult to operate than are non-child-resistant models. This could result in some consumers switching to substitute products, such as cigarette

²⁰ According to the SBA guidelines, a manufacturer of multi-purpose lighters (SIC 3999) is considered to be a small business if it has fewer than 500 employees; a wholesaler or importer of multi-purpose lighters (SIC 5199) is considered small if it has fewer than 100 employees (13 CFR 121.601).

lighters or matches. However, as was the case with child-resistant cigarette lighters, manufacturers are likely to develop child-resistant multi-purpose lighters that are at most only slightly more difficult for adults to operate than the non-child-resistant lighters. Therefore, the number of consumers who stop using multi-purpose lighters because of the child-resistant mechanisms is expected to be small. Moreover, even if some consumers do switch to other products, the risk of fire is not expected to increase significantly. Most cigarette lighters must already meet the same child-resistance standard that multi-purpose lighters will have to meet. Although consumers who switch to matches (as opposed to using child-resistant cigarette or multi-purpose lighters) may increase the risk of child-play fires from matches somewhat, matches are inherently more child-resistant than non-child-resistant multi-purpose lighters.²¹ Thus, even if some consumers did switch to using matches, the risk of child-play fires would still likely be less than if they continued to use non-child-resistant multi-purpose lighters.

Some manufacturers of micro-torches may respond to the rule by no longer offering micro-torches that have internal ignition mechanisms. The consumer would, therefore, have to use an external ignition source to light the torch. Although this option may not increase manufacturing costs, it could reduce the convenience and utility of the multi-purpose lighters. Consumers will have to provide external ignition sources, such as matches, to ignite the torches, which adds to the consumers' cost. It will also take more time to ignite such a torch, since both hands will be required and the worker or consumer will have to put down what they were working with to pick up the ignition source.

Alternatives Considered to the Rule

The staff considered several possible alternatives to the rule. These alternatives included (1) not taking any action and relying on voluntary efforts, (2) issuing labeling requirements instead of performance requirements, and (3) narrowing the scope of the rule. The staff also considered different effective dates and some alternatives aimed at reducing the burden on certain small businesses.

No Action/Rely on Voluntary Efforts

The staff considered the impact of taking no action to reduce the occurrence of fires started by children playing with multi-purpose lighters. If no mandatory rule is issued, some

²¹ A report published by SOS FIRES: Youth Intervention Programs (www.sosfires.com) states that "[m]ost young children are not capable of successfully manipulating matches...." (Juvenile Firesetting - A 4 Year Perspective (December 1997)). On the other hand, CPSC baseline testing of multi-purpose lighters showed that 59 to 96 percent of the children in the test panels could operate the non-child-resistant multi-purpose lighters tested.

manufacturers may still introduce child-resistant multi-purpose lighters. While these manufacturers can emphasize the safety of their product, they would be at a competitive price disadvantage compared to manufacturers who continue to sell non-child-resistant lighters. This would result in a lower level of benefits than would be obtained with the rule.

Although the portion of the market that would be captured by manufacturers of child-resistant lighters is not known, it is reasonable to assume it would be substantially less than 100 percent. Perhaps only 3 or 4 firms would offer such products. Thus, the benefits to society of taking no action or relying on voluntary efforts would be lower than they would be under a mandatory rule.

Currently, there is no voluntary standard for child-resistant multi-purpose lighters. However, the Commission could work with appropriate standards-setting organizations to develop such a standard. However, even if a voluntary standard were developed, conformance with such a standard may be low since many of the products are imports. Therefore, we expect that the net benefits of any voluntary standard that could be developed would be lower than under a mandatory rule.

Labeling Requirements

The staff considered the impact of not issuing a performance standard, but to instead require additional warning labels on multi-purpose lighters. However, the Federal Hazardous Substances Act already requires multi-purpose lighters to be labeled "Keep out of reach of children." The effectiveness of additional labeling would be low.

Narrowing the Scope

The staff considered the impact of exempting the more expensive multi-purpose lighters from the rule. This would have been similar to the exemption in the cigarette lighter standard for certain luxury cigarette lighters for which there was little evidence of involvement in child-play fires. However, the staff believes that the more expensive multi-purpose lighters are as likely to be involved in child-play fires as the less expensive models.

There is no evidence that the more expensive multi-purpose lighters, those retailing for more than \$20, are stored or used more safely around the home than are the more common and less expensive lighters. In fact, some of the more expensive lighters are relatively large and may be more difficult to store out of reach of children. At least one expensive multi-purpose lighter appears to be designed to be displayed in the home around the fireplace. Thus, the more expensive multi-purpose lighters may be as accessible to children as are the less expensive

lighters. Furthermore, baseline testing demonstrates that one expensive lighter design is at least as easy for children to operate as less expensive models. Therefore, while exempting the more expensive multi-purpose lighters from the rule may reduce the costs, it would also reduce the benefits.

The staff also considered the impact of excluding micro-torches from the rule. The Commission received several comments from the lighter industry, in response to the NPR, encouraging the Commission to exclude micro-torches. The commenters argued that micro-torches are a different class of product from multi-purpose lighters and are more suited for use in activities such as soldering, welding, heat shrinking, and household repairs than for lighting grills, candles, campfires, and other objects. However, many firms are promoting micro-torch lighters for these latter uses. The staff believes that micro-torches will be stored around the home in the same way that multi-purpose lighters are, and therefore, they will be accessible to small children.

The staff is aware of only one incident involving a fire started by a child under the age of 5 with a micro-torch-type lighter. The lighter was being used to light the pilot light of a gas furnace, a use more characteristic of multi-purpose lighters than of torches. However, micro-torch lighters represent only a small portion of the multi-purpose lighters in use. Micro-torches probably account for significantly less than 5 percent of sales of multi-purpose lighters. Therefore, the lack of other incidents involving micro-torches may be related to the low number of these products in use.

Alternative Effective Date

In order to issue a rule with an effective date of more than 180 days or less than 30 days, the Commission has to find that the longer or shorter date is in the public interest (15 U.S.C. 2058(g)(1)). The rule incorporates an effective date of 12 months from the date of publication in the Federal Register. The 12-month effective date lessens the economic burden of the rule, especially on small firms, while providing protection to consumers in a reasonably expeditious manner.

While developing the Cigarette Lighter Safety Standard the staff estimated that it would take an average of 12 months to develop, test, retool for production, perform production tests, and manufacture and ship the product.²² The results of the conformance testing must be reported to CPSC at least 30 days in advance of the importation or distribution of the lighters. In addition, the time required for importing complying lighters into the United States will be a significant consideration for many firms. Some manufacturers, especially those that have been following the

²²CPSC Memorandum dated February 8, 1991, from Dale R. Ray (ECPA) to Barbara Jacobson (HS).

Commission's activities with regard this rulemaking proceeding, may have already begun developing child-resistant models. Manufacturers who have had experience with developing child-resistant cigarette lighters may be able to take advantage of their experience with the cigarette lighter standard and be able to manufacture and market child-resistant lighters sooner than 12 months. In fact, at least one model is already on the market and we are aware of other manufacturers that are working on child-resistant designs.

On the other hand, manufacturers who have not followed or only very recently started following the Commission's activity in this rulemaking procedure may not have begun any development work. Additionally, manufacturers that do not also produce cigarette lighters, such as some micro-torch manufacturers, do not have prior experience developing child-resistant designs. These manufacturers may be adversely affected by an effective date shorter than 12 months.

A 12-month effective date does not mean that no benefits will occur until one year after the publication of the rule in the Federal Register. Indeed, one manufacturer already has a child-resistant multi-purpose lighter on the market. Other manufacturers can be expected to introduce their own models as they get them developed. Therefore, we expect that the number of child-resistant multi-purpose lighters on the market will increase prior to the effective date of the rule. For the reasons stated above, the staff concludes that the Commission could find that a 12-month effective date is in the public interest.

Alternatives to Reduce the Burden on Small Businesses

The staff considered several exemptions or special provisions to the rule that were intended to reduce the regulatory burden on certain small businesses. These provisions would have applied only to businesses that met the SBA definition of a small business and were not owned by or a subsidiary of a larger company, unless the combined employment would still meet the SBA criteria.

Alternative Effective Date. The staff considered establishing an effective date more than 12 months after the date of publication of the rule in the Federal Register for certain small manufacturers. The intent of this extension would be to reduce the burden of the rule on small firms by giving them extra time to develop child-resistant lighters and bring them to market. However, CPSC is aware of several small businesses that appear likely to have child-resistant multi-purpose lighters ready to market by the time the rule becomes effective. Therefore extending the effective date could actually hurt the competitiveness of small firms that developed child-resistant designs early against firms that delayed developing child resistant technologies.

Exemption from Testing. The staff considered exempting some small businesses from the requirement to conduct child-panel tests, if the firm had a reasonable basis to believe that the multi-purpose lighter would pass the tests if they were conducted. However, the staff concluded that conducting these tests is necessary to ensure that the lighter is child-resistant. The actual child-panel tests are a small part of the entire cost of designing and bringing a child-resistant lighter to market. Although the average cost per model may be about \$25,000, the costs may vary among firms. On the low end, the costs may be as low as \$10,000 if surrogates do not have to be designed, only one panel is required, and the company can conduct much of the testing internally. On the other hand, the costs could exceed \$40,000 if the company has to design surrogates, use more than one child-panel for the tests or has to redesign lighter because it fails the test. If a manufacturer is confident that its design is child-resistant, it should also be confident that the cost of the certification testing will be on the low side of the estimated range of costs. Furthermore, the testing is a one time cost. Once a design passes the qualification test, it does not have to be tested again for child-resistance. If certain small firms were exempted from the testing and one of their models was later found not to be child-resistant the cost to the manufacturer of a recall could exceed the cost of the testing. Moreover, if an exemption from testing was granted and a lighter was not in fact child-resistant, it could lead to hundreds of thousands or millions of non-child-resistant multi-purpose lighters being introduced into commerce. Just one additional child-play fire incident associated such a lighter could result in societal costs that greatly exceed the cost of the certification testing. Therefore, the staff does not believe that it is in the public interest to grant small firms an exemption from the testing requirements of the rule.

Environmental Assessment

Pursuant to the National Environmental Policy Act and CPSC's procedures, consideration has been given to the potential environmental effects of the rule. Less than 1 percent of the non-child-resistant multi-purpose lighters that are sold in this country are manufactured domestically.

The rule is not expected to significantly alter the amount of materials, energy, or waste generated during production of the lighters. Nor is the rule expected to cause manufacturers to shift production to other countries or locations. Molds and other tools used by manufacturers in the production of multi-purpose lighters or their components are periodically replaced. Potentially, the rule may cause some manufacturers to replace the molds and other tools earlier than they would have otherwise. However, an effective date of one year from the publication date of a final rule should allow most manufacturers time to plan the changeover and minimize any impact.

The rule does not require any recall of existing non-child-resistant lighters; therefore, there are no disposal issues with regard to the non-child-resistant lighters manufactured or imported before a final rule becomes effective. The rule is not expected to affect the manner in

which multi-purpose lighters are packaged for sale, or to affect the amount of butane or other fuel used in the operation of the lighters.

The staff concludes, from the available information, that the rule would not significantly affect raw material usage, air or water quality, manufacturing processes, or disposal practices in a way that would significantly impact the environment.

Conclusion

The rule would have net benefits to consumers, probably exceeding \$17.2 million annually. The rule should approach its maximum effectiveness within a few years after its effective date, since most multi-purpose lighters typically have useful lives of about one year. At that time the number of fires started by young children playing with multi-purpose lighters should be reduced by about 75 percent of what would have been expected in the absence of the rule.

There is at least one model of multi-purpose lighter on the market now that complies with the provisions of the rule. It is expected that other manufacturers will be producing complying multi-purpose lighters before the rule goes into effect. Therefore, there should be no disruption in the supply of multi-purpose lighters.

It is possible that some manufacturers, especially those with a small share of the market, may decide not to make the needed investment to develop child-resistant multi-purpose lighters. This required investment could be as much as \$2 million per manufacturer. Some small manufacturers or importers may stop producing multi-purpose lighters for the U.S. market, at least temporarily. However, the market has become more competitive in recent years and several small firms are known to be developing child-resistant multi-purpose lighters. Therefore, any adverse impact on competition in the market would be small and temporary.

A number of alternatives to the rule were considered, including options regarding various aspects of the rule itself. These alternatives include narrowing the scope to exclude micro-torches and high-end lighters, alternative effective dates, and relying on voluntary efforts. While some of the options may reduce the total costs of the rule, the level of safety and benefits would also be reduced.

The rule is not expected to have any significant impact on raw material usage, air or water quality, manufacturing processes, or disposal practices in a way that would significantly impact the environment.