



UNITED STATES
 CONSUMER PRODUCT SAFETY COMMISSION
 4330 EAST WEST HIGHWAY
 BETHESDA, MD 20814

BP - CPSA 15j Rule: Hand-Held Hair Dryers
 The contents of this document will be
 discussed at the Open Commission Meeting
 on Wednesday, April 28, 2010

VOTE SHEET

Date: **APR 21 2010**

**THIS MATTER IS NOT
 SCHEDULED FOR A BALLOT
 VOTE.**

**A DECISION MEETING FOR THIS
 MATTER IS SCHEDULED ON: May
 5, 2010.**

TO : The Commission
 Todd Stevenson, Secretary

THROUGH: *MB* Maruta Z. Budetti, Executive Director *MB*

FROM : Cheryl A. Falvey, General Counsel *CAF*
 Philip L. Chao, Assistant General Counsel, RAD *PLC*
 Patricia M. Pollitzer, Attorney *MP*

SUBJECT : Substantial Product Hazard List: Hand-Held Hair Dryers; Notice of Proposed Rulemaking

The Consumer Product Safety Improvement Act (“CPSIA”) added a new subsection (j) to section 15 of the Consumer Product Safety Act (“CPSA”). This new subsection gives the Commission authority to specify by rule for a consumer product or class of consumer products, characteristics whose presence or absence the Commission considers present a substantial product hazard. The staff is forwarding to you a briefing package recommending that the Commission issue a notice of proposed rulemaking (“NPR”) that would designate any hand-held hair dryer lacking integral immersion protection to be a substantial product hazard under section 15(j) of the CPSA. A draft NPR is provided for your consideration at Tab E of the briefing package.

Please indicate your vote on the following options.

- I. Approve publication, in the *Federal Register*, of the draft NPR designating any hand-held hair dryer lacking integral immersion protection to be a substantial product hazard under section 15(j) of the CPSA without change.

 Signature

 Date

RH 4/21/2010
 CLEARED FOR PUBLIC RELEASE
 UNDER CPSA 6(b)(1)

II. Approve publication, in the *Federal Register*, of the draft NPR designating any hand-held hair dryer lacking integral immersion protection to be a substantial product hazard under section 15(j) of the CPSA with changes (please specify changes):

Signature

Date

III. Do not approve publication, in the *Federal Register*, of the draft NPR designating any hand-held hair dryer lacking integral immersion protection to be a substantial product hazard under section 15(j) of the CPSA.

Signature

Date

IV. Take other action (please specify):

Signature

Date



Staff Briefing Package

Hand-Held Hair Dryers
April 28, 2010

RH 4/21/2010
CLEARED FOR PUBLIC RELEASE
UNDER CPSA 6(b)(1)

THIS DOCUMENT HAS NOT BEEN
REVIEWED OR ACCEPTED BY THE
COMMISSION.

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Briefing Memo



UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
4330 EAST WEST HIGHWAY
BETHESDA, MARYLAND 20814

This document has been
electronically approved and signed.

Memorandum

Date: **APR 21 2010**

TO : The Commission
Todd Stevenson, Secretary

THROUGH: Cheryl A. Falvey, General Counsel
Maruta Z. Budetti, Executive Director

FROM : Randy Butturini
Office of Hazard Identification and Reduction

Robert J. Howell
Assistant Executive Director
Office of Hazard Identification and Reduction

SUBJECT : Substantial Product Hazards Posed by Hand-held Hair Dryers Without
Immersion Protection: Staff Draft Proposal for a Notice of Proposed
Rulemaking under Section 15(j) of the Consumer Product Safety Act

I. Introduction

Section 15 of the Consumer Product Safety Act (CPSA) defines a substantial product hazard as either a failure to comply with an applicable consumer product safety rule, regulation, or ban under any other Act enforced by the U.S. Consumer Product Safety Commission (CPSC, or Commission) which creates a substantial risk of injury to the public, or a product defect which (because of the pattern of defect, the number of defective products distributed in commerce, the severity of the risk, or otherwise) creates a substantial risk of injury to the public.¹

On August 14, 2008, the Consumer Product Safety Improvement Act (CPSIA) was signed into law². The CPSIA expanded Section 15 of the CPSA by creating a new subsection (j) that allows the Commission to specify by rule for a consumer product, or class of consumer products, characteristics whose presence or absence the Commission considers present a substantial product hazard. Section 15(j)(1) of the CPSA is as follows:

¹ 15 U.S. Code, § 2064.

² Public Law 110-314.

(j) SUBSTANTIAL PRODUCT HAZARD LIST.--

(1) IN GENERAL.--The Commission may specify, by rule, for any consumer product or class of consumer products, characteristics whose existence or absence shall be deemed a substantial product hazard under subsection (a)(2), if the Commission determines that--

(A) such characteristics are readily observable and have been addressed by voluntary standards; and

(B) such standards have been effective in reducing the risk of injury from consumer products and that there is substantial compliance with such standards.

A hand-held hair dryer is a portable cord-and-plug-connected electrical appliance, which typically has a big barrel-like body with a pistol-grip handle. Frequently, the hair dryer has two control switches or knobs: one turns the unit on and off and may allow the user to adjust the blower speed; the second adjusts the heat setting, often "cool/low/high." Hand-held hair dryers routinely contain open-coil heating elements that are, in essence, uninsulated, electrically energized wires across which a fan blows air. These dryers are typically used in bathrooms near water sources, such as sinks, bathtubs, and lavatories. Being uninsulated, if the heating element were to contact water, an alternative current flow path could easily be created, posing the risk of shock or electrocution to the user holding the dryer (or retrieving it after dropping it into a sink, bathtub, or lavatory).

The applicable voluntary standards for safety, UL 859 *Household Electric Personal Grooming Appliances* and UL 1727 *Commercial Personal Grooming Appliances* require that integral protection against shock or electrocution hazards be incorporated into the hair dryer. CPSC staff considers hand-held hair dryers without immersion protection to be a candidate for specifying by rule as a substantial product hazard. The Office of Compliance, through the issuance of a letter dated November 25, 2002, has considered hand-held hair dryers (both household and commercial) without immersion protection to be a substantial product hazard. CPSC Staff believes that all four conditions required for inclusion on the substantial product hazard list have been fulfilled in the case of hand-held hair dryers.

II. Immersion Protection is Readily Observable

UL 859 and UL 1727 essentially require that immersion protection be an integral part of the attachment plug. This protection device is recognizable as a relatively large block-shaped plug that incorporates the plug blades for connection to the electrical receptacle and usually carries two pushbuttons, labeled "Test" and "Reset."

Depending on the circuitry inside the plug body, it may be a Ground-fault Circuit-interrupter (GFCI), an Appliance Leakage Circuit Interrupter (ALCI), or an Immersion Detection Circuit Interrupter (IDCI). A GFCI or an ALCI detects any imbalance between the current flowing into the hair dryer through the power cord and the current flowing out of it. If the imbalance is greater than a tiny amount (six milliamperes maximum), a switch automatically disconnects electric power from the device. An IDCI connects to a sensing element inside the hair dryer through a third conductor built into the power cord

and detects current flow if the element becomes wet from immersion in water. Like the ALCI, an IDCI disconnects electric power from the hair dryer at the plug if the detected current flow is above a threshold value.

After GFCI/ALCI or IDCI activation, pressing the Reset button reconnects electric power to the hair dryer. Pressing the Test button shunts a fixed leakage current into the detection circuitry as a means of determining its operability. Figure 1 shows a picture of a power cord with an integral ALCI at the plug end.

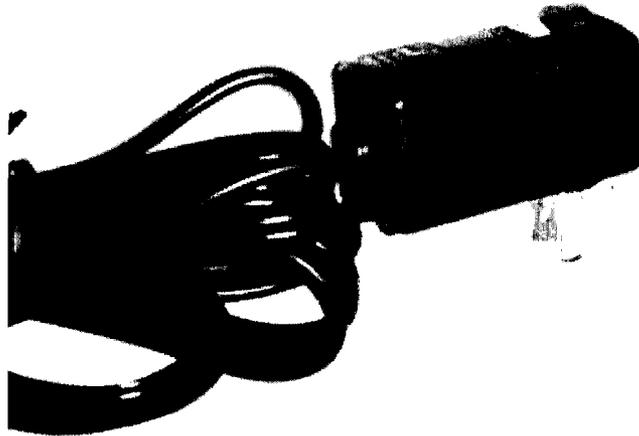


Figure 1: ALCI-Equipped Power Cord

The voluntary standards also allow the immersion protection to be incorporated into the hair dryer body. However, CPSC staff is not aware of any GFCI/ALCI or IDCI devices that are incorporated into the body of hand-held hair dryers. Such an arrangement would require waterproof coverings for the GFCI/ALCI or IDCI circuitry, and is considered impractical and expensive for a mass-produced item such as a hand-held hair dryer. The block-shaped plug is readily observable without disassembly of the product; although in practice, it may be necessary to remove the dryer from its box in order to see the power cord end.

III. Immersion Protection Has Been Addressed by the Voluntary Standards

Before immersion protection was instituted on hand-held hair dryers, a number of shock and electrocution incidents were associated with this product. According to the CPSC Death Certificate Database, between 1984 and 1990, 73 electrocutions were

attributed to hair dryers³. Both the National Fire Protection Agency (NFPA) and Underwriters Laboratories (UL) recognized this hazard and amended their standards to address this situation. The NFPA changed the National Electrical Code⁴ (NEC) in 1975 to require the use of Ground-Fault Circuit-Interrupters in new or renovated bathrooms. The 1990 NEC first introduced an immersion protection requirement for hand-held hair dryers.

UL amended its voluntary standard, UL 859 *Household Electric Personal Grooming Appliances*, to require immersion protection for hand-held hair dryers with the On/Off switch in the Off position. This change took effect in October 1987. A further change, requiring immersion protection for both On and Off switch positions, took effect for products manufactured after January 1, 1991. Similar actions were taken with respect to commercial hand-held hair dryers with UL 1727 *Commercial Electric Personal Grooming Appliances* in 1994. This latest change has, to date, only been implemented in UL-listed hand-held hair dryers through the use of an ALCI or IDCI at the plug end of the power cord.

IV. Such Standards Have Been Effective in Reducing the Risk of Injury

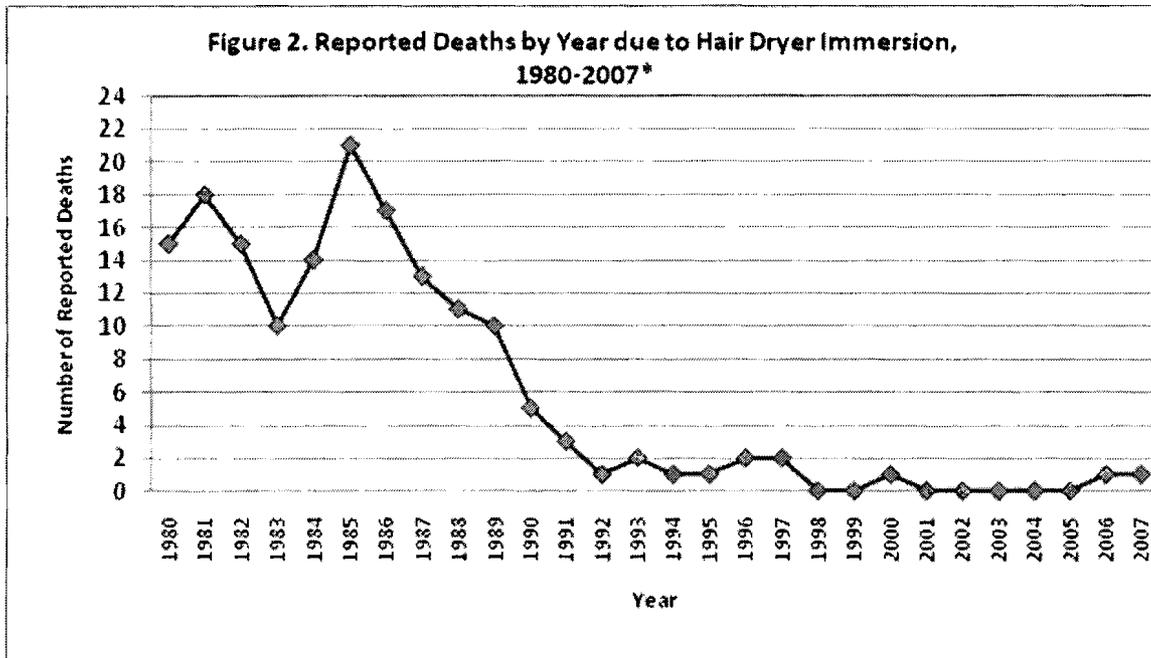
Hand-held hair dryers have a usual life span of between four and seven years. Thus, any change in their design (such as a change to comply with a new requirement in the voluntary standard) will manifest its effectiveness over a comparable period of time. If the CPSC Death Certificate Database results for the period 1984-2004 are divided into three seven-year periods, the earliest period is just before the last change to the UL voluntary standards; the middle period is just after the change to UL 859 took effect; and the last period is after the oldest hair dryers without immersion protection should have been replaced by newer models. Table 1 lists the database totals for the periods 1984-1990, 1991-1997, and 1998-2004.

Period	1984 - 1990	1991-1997	1998-2004
Deaths	91	12	1

Figure 2 presents the number of reported electrocutions due to hair dryer immersion/ water contact by year for the period 1980-2007 for both death certificate data and non-overlapping Injury and Potential Injury Incident (IPII) reports. This shows that the number of deaths had started to decline in the late 1980s. This early decrease may be due to the impact of the 1975 NEC change requiring GFCIs in bathrooms coupled with the 1987 UL standard change. A dramatic decrease in hair dryer deaths occurred as older, unprotected units were replaced by units with ALCI or IDCI immersion protection.

³ According to Besley, Drucie, *Milestones: Death Certificates*, April 2006. Directorate for Epidemiology. Division of Hazard and Injury Data Systems. The majority of death certificates with electrocution associated with hand-held hair dryers as cause of death have been obtained since 1979.

⁴ NFPA 70.



*Reporting is ongoing for 2006 and 2007.

V. There is Substantial Compliance with Such Standards

The Directorate for Economic Analysis staff states that the UL Online Certifications Directory shows 16 firms that are listed as producing hand-held hair dryers that comply with the voluntary standard for consumer hand-held hair dryers, UL 859, and an additional 9 firms are listed as producing products complying with UL 1727⁵. On the ETL-Intertek directory of listed products, 42 additional firms are listed as producing hand-held hair dryers compliant to UL 859 and 4 firms are listed as producing products compliant to UL 1727⁶.

In 2007, the three largest firms in the hand-held hair dryer industry accounted for 92% of industry unit sales⁷, and all of these firms sell UL-listed products. Therefore, because the largest three firms account for 92% of domestic sales and because there are 55 additional firms that sell UL 859-listed products and 13 selling UL 1727-listed hand-held hair dryers, the overall percentage of unit sales that comply with the voluntary UL standard is probably well in excess of 95%. By any measure, this would qualify as substantial compliance in the marketplace with the UL voluntary standards.

The hand-held hair dryer industry is considered to be a mature industry, with few new entrants and a low level of technological innovation. Hand-held hair dryer sales are

⁵ UL Online Certifications Directory < <http://database.ul.com/cgi-bin/XYV/template/LISEXT/IFRAME/index.htm>>

⁶ Intertek Directory of Listed Product Search

<[http://etlwhidirectory.etlsemko.com/WebClients/ITS/DLP/products.nsf/\\$\\$\\$Search?OpenForm](http://etlwhidirectory.etlsemko.com/WebClients/ITS/DLP/products.nsf/$$$Search?OpenForm)>

⁷ "The Share-of-Market Picture for 2007: Personal Care Appliances." *Appliance Magazine* September 2008, p. 42.

expected to be in the order of 24 million units for 2009⁸. Unless a dramatic change in market structure occurs, the three largest firms should continue to sell the substantial proportion of unit sales; and the industry, in general, should continue to exhibit a high level of compliance to the voluntary standards.

VI. Environmental Considerations

Generally, CPSC requirements are considered to “have little or no potential for affecting the human environment,” and environmental assessments are not usually prepared for such actions (see 16 C.F.R. §1021.5(c)(1)). With the UL and NFPA standards well established, and compliance to the standards above 95%, declaring hand-held hair dryers without immersion protection a substantial product hazard is not expected to have a negative environmental impact.

VII. Recommended Effective Date

The staff recommends that the listing of hand-held hair dryers without immersion protection as a substantial product hazard become effective 30 days after publication of notice of a final rule in the Federal Register.

VIII. Commission Options

The following options are available for Commission consideration.

1. Publish a Notice of Proposed Rulemaking as drafted by the Office of the General Counsel.
2. Publish a Notice of Proposed Rulemaking with changes as directed by the Commission.
3. Other options as directed by the Commission.

IX. Staff Recommendation

CPSC staff recommends that the Commission publish the Notice of Proposed Rulemaking as drafted by the Office of the General Counsel. CPSC staff also recommends an effective date of 30 days after publication of the final rule in the Federal Register.

⁸ Ritchey, Diane. “2009: Hope for Recovery.” Appliance Magazine January 2009: p. 28.

TAB A: Impact of Standard to Prevent Electrocutions from Immersions of Hand-Held Hair Dryers

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UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
4330 EAST WEST HIGHWAY
BETHESDA, MARYLAND 20814

Memorandum

APR 21 2010

TO : Randy Butturini
Electrical Engineer
Electrical Program Area Team Leader
Division of Electrical Engineering

THROUGH: Russell Roegner, Ph.D.
Associate Executive Director
Directorate for Epidemiology

Kathleen Stralka
Director
Division of Hazard Analysis

FROM : Sarah Garland, Ph.D. and Sadeq Chowdhury, Ph.D.
Mathematical Statistician
Division of Hazard Analysis

SUBJECT : Impact of Standard to Prevent Electrocutions from Immersions of Hand-Held Hair Dryers

Executive Summary

An Underwriters Laboratories voluntary standard on hand-held hair dryers took effect in 1987 (UL 859, *Household Electric Personal Grooming Appliances*) to protect against electrocution (death) if a plug-connected hand-held hair dryer with its switch in the 'off' position is accidentally immersed in water. An enhancement of the standard took effect in 1991, to prevent electrocution if the hand-held hair dryer is immersed in water with the switch in either the 'off' or the 'on' position. This was followed by a similar change to another voluntary standard that took effect in 1994, UL 1727, *Commercial Electric Personal Grooming Appliances*. This report presents an evaluation of the impact of these standards on electrocutions associated with hand-held hair dryers.

As reported to the Consumer Product Safety Commission (CPSC) staff, the numbers of incidents involving electrocutions due to hand-held hair dryer immersion/contacting water had started decreasing rapidly since the mid-to-late eighties. An annual average of about 16 such deaths was reported during 1980-86 which decreased to about ten during 1987-1990 followed by about two during 1991-1997 and less than one during 1998-2007. This suggests a possible association of the introduction of the requirements in the standards and the reduction of the reported number of electrocutions associated with hand-held hair dryer immersions. Other

factors that may have contributed to the rapid impact on the decrease of reported electrocutions are various efforts undertaken in the early to mid-1980s to warn consumers about not using hand-held hair dryers in bathtubs or close to water.

The estimated number of consumer product-related electrocutions decreased 36% from the 1984-1986 annual average of 340 to the 1994-1996 annual average of 216. This decrease may reflect the impact of various public safety messages and standards introduced for similar appliances in the 1980s and 1990s to reduce the overall incidents of electrocutions. When considering the decrease in the number of deaths reported to CPSC staff due to hand-held hair dryers being immersed in or contacting water in the period from the mid-1980s to the mid-1990s, there was a greater than 90% decrease in the average numbers of deaths. Although the overall efforts to reduce the number of electrocutions in general most likely impacted the decrease in the reported number of deaths from hand-held hair dryer electrocutions, the introduction of the requirements in the standards for hand-held hair dryers seem to have played a major role in reducing the electrocutions.

Introduction

Hand-held hair dryers are often used near water and subject to accidental immersion during normal use. During 1980-86, an average of about 16 deaths per year involving hand-held hair dryer immersions were reported to the Consumer Product Safety Commission (CPSC) staff. Most of these deaths were electrocutions due to immersion of plugged-in hand-held hair dryers in bathtubs. In October 1987, a provision of an Underwriters Laboratories Inc. voluntary standard on hand-held hair dryers (UL 859, *Household Electric Personal Grooming Appliances*) took effect to protect against electrocution when a cord and plug connected hair dryer is immersed in water with its switch in the 'off' position. In January 1991, requirements were added to prevent electrocution if the hair dryer is dropped in water regardless of whether the switch is in the 'on' or in the 'off' position. In March 1994, the immersion protection requirements were added to another voluntary standard (UL 1727, *Commercial Electric Personal Grooming Appliances*). The standards of 1991 and 1994 followed a requirement in the National Electrical Code (Article 422-24, 1990 edition) to protect against electrocutions from immersion of hair dryers. CPSC staff had expected that the new standard would reduce the number of hand-held hair dryer-related electrocutions by about half (Blechsmidt, 1989). This document provides a brief evaluation of the impact of these standards on the incidents of electrocutions as characterized by reports to CPSC staff.

Data Source

Data used for this evaluation are obtained from the CPSC's National Electronic Injury Surveillance System (NEISS), the CPSC Death Certificate database (DTHS), and the CPSC Injury or Potential Injury Incidents database (IPII). The NEISS is based on consumer product-related injuries treated in a sample of hospital emergency departments. Since the sample of hospitals are selected using a probability-based scheme, the NEISS can be used to produce national estimates of product-related injuries. However, DTHS and IPII are neither probability samples nor complete counts of incidents and are not suitable for producing national estimates. The IPII database is based on reported cases of injuries and deaths from various sources that can be used for this evaluation only under the assumption that the volume and type of reporting remained fairly stable over the years. The DTHS database is based on a proportion of death certificates obtained from the states for selected consumer product-related deaths. Fortunately,

the majority of death certificates with electrocution associated with hand-held hair dryers as cause of death has been obtained since 1979 (Besley, 2006). It should be noted that the causes of deaths up to 1998 are based on the ninth revision of the International Classification of Diseases, Injuries, and Causes of Deaths (ICD-9) while the causes of deaths since 1999 are based on the tenth revision (ICD-10). Although ICD-10 codes are different from ICD-9 in many cases, an analysis indicates that the comparability ratio between ICD-9 and ICD-10 codes for electrocutions is 1.00 implying a strict comparability between ICD-9 and ICD-10 (Ault, 2001). Therefore, the count of deaths in DTHS related to hand-held hair dryers can be used for this evaluation without any major reservation.

For the purposes of this analysis, the incidents considered in scope were those involving hand-held hair dryers. A hand-held hair dryer is an electrical appliance, intended to be held with one hand during use, that creates a flow of air over or through a self-contained heating element for the purpose of drying hair. In many of the incidents reported to CPSC staff, full product descriptions were not available (i.e., there was no elaboration on the type or style of the hair dryer). These reports simply described the product as a hair dryer or an electric hair dryer. These incidents were assumed to involve hand-held hair dryers, considered as in scope, and included in this analysis. One report described the incident product as a “blow comb” and was considered in scope for this analysis. Reports considered out of scope and not included in the analysis were those indicating the incident hair dryer was a bonnet-style hair dryer.

Results

1984 - 2004

Table 1 presents a summary of the reported incidents of deaths and electrical shock injuries associated with hand-held hair dryers as obtained from incidents reported to the CPSC staff. Multiple reports of the same fatality within IPII and between DTHS were only counted once. The reported deaths are separated into electrocutions due to immersion/contacting water by hand-held hair dryers and all other reported deaths associated with hand-held hair dryers. The table only includes reported electrical shock injuries due to hand-held hair dryers contacting water. All other reported injuries associated with hand-held hair dryers are excluded from this table.

To facilitate the comparison, the results for 1984-04 are summarized in three consecutive 7-year time periods. The 1984-90 category covers the period just before the establishment of the 1991 enhanced standard on hand-held hair dryers, the 1991-97 category corresponds to the period when compliant hair dryers to the 1991 and the 1994 enhanced standards and also pre-standard hair dryers were likely to be in use, and the 1998-2004 category covers a period when most pre-standard hand-held hair dryers were likely to be out of use as the usual life span of a hand-held hair dryer is expected to be 4 to 7 years. The 7-year comparative periods are used to accumulate enough reported incidents in each period so that the difference between the periods can be easily detected, and also to separate the middle 7-year period when both compliant and pre-standard hand-held hair dryers were likely to be in use.

Table 1 shows that, due to hand-held hair dryer immersion/contacting water, a total of 104 incidents of deaths (80 in DTHS and 24 in IPII) while 43 electric shock injuries were reported to the CPSC staff from 1984-2004. Of the electrocutions, the most incidents (91)

occurred during 1984-90 compared to 12 during 1991-97 and 1 during 1998-2004. Although very small numbers to rely on, the numbers of reported injuries/incidents due to electric shock from hand-held hair dryer immersions/contacting water also decreased from 1984-90 to later periods. When considering the period before and after the enhanced standard on hand-held hair dryers went into effect, that is, before and after 1991, the decrease in the reported number of electrocutions was very sharp. As indicated in the death certificates, most of these electrocutions were due to immersions of hand-held hair dryers in bathtubs. Attachment 1 includes a randomly selected sample of death certificate narratives about causes of these deaths.

Table 1. Comparison of the Reported Incidents of Deaths and Injuries Associated with Hand-Held Hair Dryers during 1984 to 2004

<i>Data Source/Reasons</i>	<i>1984-90¹</i>	<i>1991-97^{2,3}</i>	<i>1998-2004</i>	<i>Total</i>
Electrocutions due to hair dryer immersion/contacting water				
DTHS	73	6	1	80
IPII ³	18	6	0	24
TOTAL	91	12	1	104
Other electrocutions/reasons				
DTHS	2	1	0	3
IPII ⁴	3	8	2	13
TOTAL	5	9	2	16
Injuries/incidents due to electric shock from hair dryer immersion/contacting water				
NEISS ⁵	6	4	3	13
IPII	27	3	0	30
TOTAL	33	7	3	43

¹In October 1987, UL-859 voluntary standard took effect for switch in the ‘off’ position.

²In January 1991, UL-859 was extended to switch in the ‘on’ and ‘off’ positions.

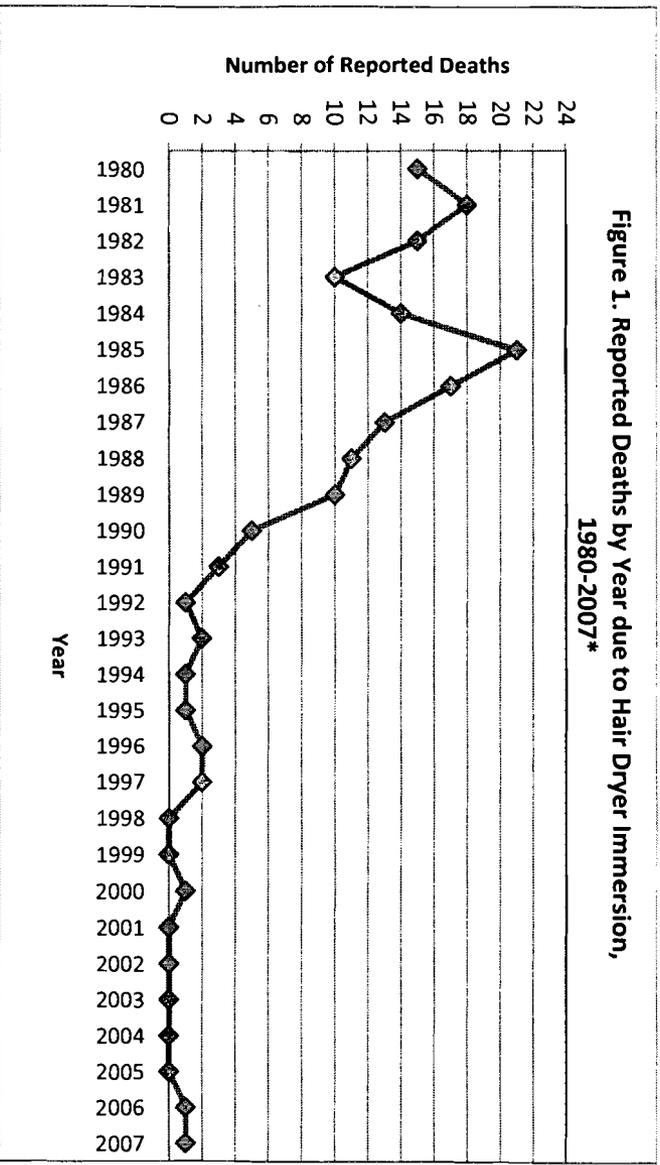
³In March 1994, UL-1727 with immersion protection requirements became effective.

⁴The same fatality reported in IPII and in DTHS is only counted once.

⁵Due to the small number of incidents, only the unweighted counts of NEISS cases are presented.

1980 – 2007

Table 2 and Figure 1 present the number of reported electrocutions due to hand-held hair dryer immersion/contacting water by year for 1980-2007. These show that the number of deaths had in fact started to decline in the late eighties. The decrease in the late eighties may be due to the impact of the earlier UL standard on hand-held hair dryers established in 1987, which further intensified after the introduction of the enhanced standards in 1991. During 1980-86, before the introduction of the initial UL standard with a requirement for immersion protection on hand-held hair dryers, a total of 110 electrocutions (15.7 annual average) was reported due to hair dryer immersion/contacting water. During 1987-90, after the introduction of the initial standard, a total of 39 such electrocutions (9.75 annual average) were reported. The enhanced standards UL-859 and UL-1727 took effect in 1991 and 1994, respectively. During 1991-97, a total of 12 electrocutions (1.71 annual average) were reported, and only three electrocutions (0.3 annual average) were reported during 1998-2007, a period when most hand-held hair dryers made before 1991 were likely to be out of use.



*Reporting is ongoing for 2006 and 2007.

Table 2. Reported Incidents of Deaths Associated with Hand-Held Hair Dryers by Year

Year	Number of Reported Deaths Associated with Hair Dryers					
	DTHS		IPII ¹		Total	
	Electrocution due to Hand-Held Hair Dryer Immersion ²	Other Reasons ³	Electrocution due to Hand-Held Hair Dryer Immersion ²	Other Reasons ³	Electrocution due to Hand-Held Hair Dryer Immersion ²	Other Reasons ³
1980	15	0	0	0	15	0
1981	13	2	5	0	18	2
1982	13	0	2	0	15	0
1983	9	0	1	1	10	1
1984	12	0	2	0	14	0
1985	19	1	2	1	21	2
1986	14	1	3	0	17	1
1987	8	0	5	0	13	0
1988	10	0	1	2	11	2
1989	6	0	4	0	10	0
1990	4	0	1	0	5	0
1991	3	1	0	0	3	1
1992	0	0	1	1	1	1
1993	1	0	1	0	2	0
1994	0	0	1	2	1	2
1995	0	0	1	2	1	2
1996	2	0	0	1	2	1
1997	0	0	2	2	2	2
1998	0	0	0	0	0	0
1999	0	0	0	0	0	0
2000	1	0	0	0	1	0
2001	0	0	0	0	0	0
2002	0	0	0	2	0	2
2003	0	0	0	0	0	0
2004	0	0	0	0	0	0
2005	0	0	0	0	0	0
2006 ⁴	1	0	0	0	1	0
2007 ⁴	1	0	0	2	1	2
Total	132	5	32	16	164	21

¹ The same fatality reported in IPII and in DTHS is only counted once

² Due to hand-held hair dryer immersion or contacting water.

³ Reasons such as ‘died when repairing hair dryer’, ‘died when plugging in hair dryer’, ‘died of house fire started from hair dryer’, etc.

⁴ Reporting is still ongoing.

Conclusion

Overall, it seems that the onset of the decrease in reported electrocutions followed immediately or even slightly earlier than the introduction of the initial voluntary standard change. Usually, there would be a time lag between the introduction of a standard and noticing any impact due to the time required for pre-standard products to be replaced by post-standard products. This early onset may be because some manufacturers usually start complying even before a standard formally comes into effect. Moreover, the earlier efforts to warn consumers about not using hair dryers in bathtubs or close to water may also have contributed to the early onset of the decrease. The earlier efforts to prevent electrocutions from hand-held hair dryers included the requirements in the UL standard to have a warning in the user guide and a label on the cord against the use of the hair dryers in bath tubs by the early 1980s. In the mid-1980s, the UL standard for household hand-held hair dryers required that they have a polarized attachment plug and that literature about the need to install Ground Fault Circuit Interrupters (GFCIs) in bathrooms be included with the product.

It should be mentioned that the overall estimated numbers of electrocutions and all consumer product-related electrocutions also decreased considerably from the mid-1980s to the mid-1990s and continuing into the 2000s. In 2003, the estimated number of deaths involving consumer products had decreased to 160 (Chowdhury, 2006) as compared to an estimate of 330 deaths in 1984 (Ault, 1998), a decrease of 52%. When considering the decline in the estimated numbers of deaths occurring in the decade from the mid-1980s to the mid-1990s, the estimated number of deaths involving consumer product-related electrocutions decreased from an average of 340 per year in the mid-1980s (1984-86) to an average of 216 per year in the mid-1990s (1994-96), a decrease of 36% (Ault, 1998 and Chowdhury, 2006). This decrease is probably due to the impact of various efforts made and standards introduced for other similar appliances in the 1980s and 1990s to reduce the overall incidents of electrocutions. The reductions in the reported incidents of electrocution associated with hand-held hair dryers may also be the result of this overall effort in addition to the standards under evaluation established for hand-held hair dryers. However, the decrease in the frequency of reported hand-held hair dryer-related electrocutions (>90%) is much higher than the decrease in the estimates of the overall consumer product-related electrocutions (36%) from the mid-1980s to the mid-1990s. Also, the numbers of reported hand-held hair dryer-related electrocutions that decreased over time are mainly the electrocutions due to immersion of hand-held hair dryers in bath tubs, the type of death which was the target of the standards for hand-held hair dryers. So, while various efforts in the early and mid-1980s to reduce the reported electrocutions associated with hand-held hair dryer immersions that culminated in the 1987, 1991, and 1994 standards probably accelerated the reduction of incidents, the introduction of these standards seems to have played a major role in reducing the number of reported electrocutions.

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7. Attachment 1

Death Certificate Narratives about Cause of Death for a Sample of Deaths that Decreased over the Years

DATE OF DEATH	NARRATIVE ABOUT CAUSE OF DEATH
MAR-81	ELECTROCUTION (CARDIAC AND RESPIRATORY ARREST) – OPERATING ELECTRIC HAIR DRYER IN BATH TUB FILLED WITH WATER - AUTOPSY YES
MAY-83	ELECTROCUTED WHEN DRYER FELL INTO BATHTUB; ELECTROCUTION AUTOPSY YES
FEB-84	ELECTROCUTION; HAIR DRYER FALLING INTO BATHTUB – ELECTROCUTED WHEN HAIR DRYER FELL IN BATHTUB - AUTOPSY YES
FEB-84	ACUTE CARDIAC ARREST; ELECTROCUTION - HAIR DRYER IMMERSSED IN BATH - AUTOPSY Y
MAR-84	ELECTROCUTION ACCIDENT - IN BATHTUB AND PULLED HAIR DRYER IN - AUTOPSY YES
JUN-84	CARDIOPULMONARY ARREST; ELECTROCUTION - ELECTRIC HAIRDRYER FELL INTO BATHRUB WITH DECEDENT.
JUL-84	ELECTROCUTION - ELECTRIC HAIR DRYER FELL INTO WATER - AUTOPSY NO
JUL-84	ELECTROCUTION - IN BATHTUB WITH BROTHER, ONE PICKED UP HAIR DRYER CONNECTED TO 110 VOLT OUTLET - AUTOPSY YES
AUG-84	ELECTRICUTION - USING HAIR DRYER IN BATH-TUB - AUTOPSY YES
OCT-84	CARDIORESPIRATORY ARREST; ELECTROCUTION - DECEASED DIED WHILE TAKING BATH AFTER HAIR DRYER FELL INTO BATHTUB - AUTOPSY YES
NOV-84	ELECTROCUTION - DROPPED BLOW DRYER IN WATER IN TUB - AUTOPSY YES
JAN-85	ASPHYXIA - CHILD FOUND FACE DOWN IN BATH WATER-ELECTRIC HAIR BLOWER LATER FOUND IN WATER - AUTOPSY YES
MAR-85	ELECTROCUTION - HAIRDRYER FELL INTO BATH TUB - AUTOPSY NO
MAR-85	DECEDENT IN BATH TUB; ELECTRIC HAIR DRYER ACCIDENTALLY FELL IN TUB - ELECTROCUTION - AUTOPSY YES
APR-85	DROWNING AND ELECTROCUTION - IN BATHTUB WITH ELECTRIC HAIRDRYER - AUTOPSY YES
MAY-85	ELECTROCUTION - HAIRDRYER FELL INTO BATHTUB CONTAINING WATER - AUTOPSY NO
JUL-85	IN BATHTUB PLAYING WITH HAIRDRYER THAT WAS PLUGGED INTO CIRCUIT - ELECTROCUTION WITH CONCURRENT IMMERSION IN FRESH WATER AUTOPSY YES
JUL-85	PROBABLE ELECTROCUTION FROM CONTACT WITH HAIR DRYER (WHILE IN BATHTUB 3/4 FILLED WITH WATER); ACCIDENT - TOUCHED PLUGGED IN HAIR DRYER WHILE GETTING OUT OF BATHTUB - AUTOPSY NO
AUG-85	WHEN HAIR DRYER PLUGGED IN, APPARENTLY ELECTROCUTED FELL INTO A BATHTUB FILLED WITH WATER - AUTOPSY YES
AUG-85	ELECTROCUTION - ELECTRIC HAIRDRYER FELL INTO BATHTUB AUTOPSY Y
AUG-85	ELECTROCUTED WHEN A HAIR DRYER PLUGGED IN FELL INTO A BATHTUB FILLED WITH WATER - AUTOPSY YES
SEP-85	ELECTROCUTION - ELECTROCUTED WHILE RETRIEVING PLUGGED HAIR DRYER FROM BATHTUB - AUTOPSY YES
SEP-85	ELECTROCUTION - USING HAIR DRYER IN BATHTUB - AUTOPSY YES
OCT-85	DROPPED HAIR DRYER IN BATHTUB - CARDIAC ARRHYTIMIA; ELECTROCUTION - AUTOPSY Y
OCT-85	DECEASED ELECTROCUTED WHILE PLUGGING IN DRYER; ELECTROCUTION - AUTOPSY YES
NOV-85	WHILE IN TUB HAIR DRIER INTO TUB OF WATER – ELECTROCUTION - AUTOPSY NO
DEC-85	PATIENT WAS BATHING WHEN THE HAIR DRYER THAT WAS OPERATING FELL INTO THE WATER - ELECTROCUTION - AUTOPSY YES
JAN-86	FELL INTO BATHTUB WITH ELECTRIC HAIR DRYER - ELECTROCUTION - AUTOPSY YES
JAN-86	ELECTRIC SHOCK BY SMALL APPLIANCE WHILE TAKING A BATH DELAYED CEREBRAL ANOXIA DUE TO NEAR DROWNING AND ELECTRIC SHOCK AUTOPSY YES
FEB-86	HAIRDRYER FELL IN WATER IN TUB - ELECTROCUTION – AUTOPSY NO
MAR-86	ELECTRIC BLOW DRYER FELL INTO BATHTUB –ACCIDENTAL ELECTROCUTION - AUTOPSY NO
APR-86	DROPPED HAIR BLOW/DRYER INTO BATHTUB – ELECTROCUTION (ACCIDENTAL); HAIR

	DRYER BEING DROPPED INTO BATHTUB - AUTOPSY YES
JUL-86	RECEIVED ELECTRIC SHOCK DURING ATTEMPT TO PLUG IN BLOW DRYER WHILE STILL WET - CARDIAC ARREST; ELECTRIC SHOCK - AUTOPSY YES
JUL-86	CONTACTED HAIR DRYER WHILE TAKING BATH - ELECTROCUTION AUTOPSY NO
JUL-86	ENERGIZED HAIRDRYER IN WATER-FILLED BATHTUB WITH VICTIM ELECTROCUTION - AUTOPSY YES
AUG-86	ELECTROCUTION, HAIR DRYER BATHTUB, APPARENTLY ACCIDENTAL AUTOPSY YES
DEC-86	ELECTRIC HANDLED HAIR DRYER WHILE BATHING IN TUB ELECTROCUTION - AUTOPSY YES
FEB-87	ELECTROUCTED IN BATHTUB WITH HAIR DRYER - ELECTROCUTION AUTOPSY NO
FEB-87	ELECTROCUTED IN BATHTUB WITH HAIR DRYER - ELECTROCUTION AUTOPSY NO
MAY-87	TOUCHED HAIR DRYER WHILE IN TUB OF WATER - PULMONARY & CEREBRAL EDEMA; ELECTROCUTION IN BATHTUB - AUTOPSY YES
AUG-87	DECEDENT PULLED HAIR DRYER INTO TUB AND ELECTROCUTED SELF - LOW-VOLTAGE ELECTROCUTION - AUTOPSY NO
NOV-87	HAIR DRYER FELL INTO BATHTUB - ELECTROCUTION (IN BATHTUB) AUTOPSY NO
DEC-87	HAIR DRYER FELL INTO TUB WITH CHILD - CARDIAC ARREST DUE TO ELECTRIC SHOCK - AUTOPSY NO
FEB-88	FOUND IN BATH WITH HAIRDRYER - CARDIO-PULMONARY ARREST SECONDARY; ELECTRIC SHOCK - AUTOPSY YES
APR-88	CONTACTED HAIR DRYER WHILE IN BATHTUB - ELECTROCUTION AUTOPSY NO
MAY-88	HAIR DRYER FELL IN BATHTUB - ELECTROCUTION; HAIR DRYER FELL IN BATHTUB - AUTOPSY NO
MAY-88	HAIR DRYER FELL INTO TUB OF WATER - CARDIAC ARREST; ACCIDENTAL ELECTROCUTION; HAIR DRYER FALLING INTO TUB - AUTOPSY NO
AUG-88	ELECTRIC HAIR DRYER FELL IN BATHTUB - DROWNING; ELECTROCUTION - AUTOPSY YES
SEP-88	USING HAIRDRYER AND WATER - ELECTROCUTION BY HAIRDRYER AUTOPSY YES
NOV-88	ELECTROCUTED WHEN PROBABLY FELL INTO WATER-FILLED BATHTUB WITH ENERGIZED PORTABLE HAIR DRYER - LOW VOLTAGE ELECTROCUTION AUTOPSY YES
DEC-88	USE OF HAIR DRYER IN BATHTUB - ELECTRICUTION - AUTOPSY YES
JAN-89	ELECTRICUTION BY HAIRDRYER WHILE IN BATHTUB - AS ABOVE AUTOPSY NO
FEB-89	ELECTRIC BLOWE DRYER APPARENTLY FELL INTO BATHTUB FROM TOWEL BAR - CARDIACO ARRHYTHMIA; ELECTROCUTION - AUTOPSY NO
AUG-89	HAIRDRYER FELL IN BATH TUB - ELECTROCUTION - AUTOPSY NO
OCT-89	SUBJECT ELECTROCUTED WHILE IN TUB OF WATER WHEN SHE PULLED HAIR DRYER INTO WATER - HYPOXIC-ISCHEMIC ENCEPHALOPATHY; CARDIORESPIRATORY ARREST; ELECTRICAL ACCIDENT - AUTOPSY NO
MAY-90	BATHTUBE/HAIR DRYER ELECTROCUTION - ASPHYXIATION; ASPIRATION OF GASTRIC CONTENTS; ELECTROCUTION - AUTOPSY YES
AUG-90	DESEASED WAS FALLING IN A TUB OF HOME WHEN A HAIR DRYERFELL INTO THE TUB - ELECTRICAL SHOCK - AUTOPSY YES - 900828HCN2341
AUG-90	HAIRDRYER PLUG INTO 110 VOLT CIRCUIT AND FELL INTO BATHTUB FILLED WITH WATER - ELECTROCUTION - 1500 WATT HAIRDRYER-110 VOLTS RUNNING IN TUB - AUTOPSY NO - 900417HCC3510
NOV-90	ELECTRIC HAIR DRYER FELL INTO BATHTUB, CIRCUMSTANCES UNKNOWN - CARDIOPULMONARY ARREST; DROWNING; ELECTROCUTION, ACCIDENTAL - AUTOPSY NO - 910116CWE5007
MAY-91	CHILD PLAYING WITH HAIR DRYER WHILE IN BATHTUB - ANOXIC ENCEPHALOPATHY; CARDIAC ARRHYTHMIA & CARDIOGENIC SHOCK; LOW VOLTAGE
JUL-91	BURNS IN CRIB BY HAIRDRYER - THERMAL INJURY - AUTOPSY YES
AUG-93	ELECTRIC HAIR DRYER IN BATHTUB WITH WATER - ELECTROCUTION- ELECTRICAL SHOCK - AUTOPSY YES
JAN-96	HAIR DRYER FELL IN BATH WATER - ELECTROCUTION - AUTOPSY NO
NOV-00	HAIR DRYER IN CONTACT WITH WET CARPETING. DECEDENT STEPPED ONTO THE WET CARPETING - ELECTROCUTION - AUTOPSY YES

TAB B: Immersion Protection – A Necessity for Hair Dryers

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UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
4330 EAST WEST HIGHWAY
BETHESDA, MARYLAND 20814

Memorandum

Date: January 28, 2010

Revised: March 23, 2009

TO : Randy Butturini, Office of Hazard Identification and Reduction

THROUGH: Robert J. Howell, Assistant Executive Director,
Office of Hazard Identification and Reduction

THROUGH: Erlinda Edwards, Acting Associate Executive Director,
Directorate for Engineering Sciences

THROUGH: Andrew M. Trotta, Division Director, Electrical Engineering Division

FROM: Robert T. Garrett, Electrical Engineer, Electrical Engineering Division

SUBJECT: Immersion Protection – A Necessity for Hair Dryers

Hand-held hair dryers lacking immersion protection present a significant hazard for causing injury or death to consumers. These hair dryers are typically used in bathrooms, near water sources such as bathtubs, showers and lavatories. A shock hazard can arise, for example, if the hair dryer is dropped into water and the user attempts to retrieve it. Staff also has documented electrocution incidents in which someone was bathing when a hand-held hair dryer fell into the bathtub. Water and metal plumbing provide conductive paths for flow of electrical current. Wet skin reduces the body's electrical resistance and increases the likelihood of injurious or fatal electrical shock by allowing a greater current flow through the victim.

The Underwriters Laboratories (UL) voluntary standards UL 859 and UL 1727 (*Household Electric Personal Grooming Appliances* and *Commercial Electric Personal Grooming Appliances*, respectively) cover household and commercial electric personal grooming appliances, including hair dryers, that are intended to be used in accordance with the National Electrical Code (NEC), NFPA 70. Shock and electrocution incidents occurred in consumers' homes with some frequency prior to implementation of the National Electrical Code provisions for Ground Fault Circuit Interrupter (GFCI) protection in new construction or renovation of bathrooms. Adoption of the NEC provisions by local building codes led to a dramatic reduction in the occurrence of serious shock and electrocution. Underwriters Laboratories' voluntary standards essentially require incorporating an immersion protection device with response characteristics similar to a GFCI onto the end of the hair dryer power cord. The device thereby

reduces the likelihood of electrocution for users whose older bathrooms – or other unprotected facilities – lack GFCI protection.

The voluntary standards now address shock and electrocution hazards essentially by requiring that any type of hand supported hair dryer “shall be constructed to reduce the risk of electric shock when the appliance is energized, with its power switch in either the ‘on’ or ‘off’ position, and immersed in water having an electrically conductive path to ground.”⁹ A revision of UL859 that became effective on October 1, 1987, only required a water-tight sealed power switch that prevented current leaking from a hair dryer that was not turned on, but the margin of safety proved insufficient. The requirements for an integral immersion protection device were added to UL859 for household products that became effective January 1, 1991. UL1727 for commercial products was revised effective in 1994 after the full immersion protection requirements proved effective

The frequency and severity of injury by electrical shock involving hair dryers has demonstrably dropped. Prior to January 1, 1991, when the full protection requirements in UL 859 became effective, CPSC documented about 14 electrocutions annually from water-immersed hair dryers. In 2000, staff found only one death involving an immersed hairdryer, one that lacked immersion protection. Although both UL standards are regularly updated, the added provisions for immersion protection by an integral protective device have proved sufficient and remain substantially unchanged.

A typical hand-held hair dryer has a big barrel-like body, sometimes bulbous, sometimes tapered, with a pistol-grip handle. Usually the hair dryer has two control switches or knobs: one turns the unit on and off and may allow the user to adjust the blower speed; the second adjusts the heat setting, often “cool/low/high.” A power cord emerges from the base of the pistol grip handle and terminates in a rather large block-shaped plug that incorporates the plug blades for connection to the electrical receptacle and usually carries two pushbuttons, labeled “Test” and “Reset.”¹⁰ Depending on the circuitry inside the plug body, it may be an ALCI, Appliance Leakage Circuit Interrupter, or an IDCI, Immersion Detection Circuit Interrupter. An ALCI operates like a GFCI by detecting an imbalance between the current flowing into the hair dryer through the power cord and the current flowing out of it. An IDCI connects to a sensing element inside the hair dryer through a third conductor built into the power cord and detects current flow if the element becomes wet from immersion in water. Pressing the “Test” button to verify that the protective device works simulates leakage current from a wet hair dryer and causes switch contacts inside the plug to open, disconnecting the cord and hair dryer from electrical power. Pressing the “Reset” button closes the internal contacts and allows the consumer to turn on the hair dryer. If the hair dryer should become wetted or immersed in water enough to cause electrical current to flow beyond normal circuitry, the Circuit Interrupter will sense the flow and, in a tiny fraction of a second, disconnect the hair dryer from its power source. Even if the consumer experienced a brief tingle of current, its duration would likely be too brief to cause serious injury.

⁹ UL859, Tenth Edition, Section 5, Hair Dryer Immersion Protection

¹⁰ An alternative construction, commercially available but little used, provides protection through a non-resettable device. The device is untestable. When it operates to cut off power, the hair dryer is thereafter rendered unusable.

TAB C: Compliance with Voluntary Standards in the Hand Held Hair Dryer Industry

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UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
4330 EAST WEST HIGHWAY
BETHESDA, MARYLAND 20814

Memorandum

Date: April 6, 2010

TO : Randy Butturini, Electrical Engineer, Electrical Program Area Team Leader,
Division of Electrical Engineering

THROUGH: Gregory B. Rodgers, PhD, Associate Executive Director, Directorate for
Economic Analysis;
Deborah V. Aiken, PhD, Senior Staff Coordinator, Directorate for Economic
Analysis

FROM : John W. Peternel, Economist, Directorate for Economic Analysis

SUBJECT : Compliance with Voluntary Standards in the Hand Held Hair Dryer Industry

Under Section 223 of the Consumer Product Safety Improvement Act, Section 15 (15 U.S.C. 2064) “the Commission may specify by rule, for any consumer product or class of consumer products, characteristics whose existence or absence shall be deemed a substantial product hazard under (a)(2) , if the Commission determines that—

- (A) Such characteristics are readily observable and have been addressed by voluntary standards; and
- (B) Such standards have been effective in reducing the risk of injury from consumer products and that there is substantial compliance with such standards.”¹¹

This memorandum provides information on the level of compliance of hand-held hair dryers to the voluntary standards UL 859, *Household Electric Personal Grooming Appliances* and UL 1727, *Commercial Electric Personal Grooming Appliances*. The voluntary standards call for incorporating a protective device into the hair dryer that reduces the likelihood of electrocution for users with older bathrooms – or other unprotected facilities – that lack ground fault circuit interrupter (GFCI) protection.

Scope of Market and Market Structure

In 2007, the three largest firms in the hand-held hair dryer industry accounted for 92% of industry unit sales¹² and these firms sell products that are compliant with the UL standards.¹³ After reviewing the UL Online Certifications Directory, EC staff identified 16 firms that are in compliance with the voluntary standard UL 859 *Household Electric Personal Grooming*

¹¹ Consumer Product Safety Improvement Act. 122 STAT. 3068 Public Law 110-314-AUG. 14, 2008.
<<http://www.cpsc.gov/cpsia.pdf>>

¹² “The Share-of-Market Picture for 2007: Personal Care Appliances.” *Appliance Magazine* September 2008. p. 42.

¹³ UL Online Certifications Directory < <http://database.ul.com/cgi-bin/XYV/template/LISEXT/IFRAME/index.htm>>

Appliances.¹⁴ Additionally, about 42 companies that are not listed in the UL online directory are listed in the ETL Intertek Directory as complying with the UL 859 standard.¹⁵ Similarly, staff identified 10 firms on the UL Online Directory, and an additional 4 listed in the ETL Intertek Directory, listed to UL 1727 *Commercial Electric Personal Grooming Appliances*. The largest firm in terms of products shipped is listed for both UL 859 and UL 1727 standards. Therefore, because the largest three firms account for 92% of domestic sales and because there are over 50 additional firms that sell products listed to the UL standards, it is reasonable to conclude that UL 859 and UL 1727 are widely accepted and that there is significant compliance within the industry. The overall percentage of unit sales that comply with the voluntary UL standards is probably well in excess of 95%.

Moreover, as the hand-held hair dryer industry is a mature industry, industry unit sales are projected to remain stable; projected sales are 23,814,000 in 2008, 23,337,720 in 2009, 23,571,097 in 2010, and 23,806,807 in 2011.¹⁶ Unless a dramatic change in market structure occurs, the three largest firms should continue to sell the substantial proportion of unit sales, and the industry, in general, should continue to exhibit a high level of conformance.

¹⁴ IBID

¹⁵ Intertek Directory of Listed Product Search

<[http://etlwhidirectory.etlsemko.com/WebClients/ITS/DLP/products.nsf/\\$\\$\\$Search?OpenForm](http://etlwhidirectory.etlsemko.com/WebClients/ITS/DLP/products.nsf/$$$Search?OpenForm)>

¹⁶ Ritchey, Diane. "2009: Hope for Recovery." *Appliance Magazine* January 2009: p. 28.

TAB D: Regulatory Flexibility Analysis: Hand Held Hair Dryers

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UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
4330 EAST WEST HIGHWAY
BETHESDA, MARYLAND 20814

Memorandum

Date: April 6, 2010

TO : Randy Butturini, Electrical Engineer, Electrical Program Area Team Leader,
Division of Electrical Engineering

THROUGH: Gregory B. Rodgers, PhD, Associate Executive Director, Directorate for Economic
Analysis;
Deborah V. Aiken, PhD, Senior Staff Coordinator, Directorate for Economic
Analysis

FROM : John W. Peternel, Economist, Directorate for Economic Analysis

SUBJECT : Regulatory Flexibility Analysis: Hand Held Hair Dryers

This memorandum provides a small business impact analysis of including hand held hair dryers lacking immersion protection in a list of substantial product hazards under Section 223 of the Consumer Product Safety Improvement Act (CPSIA). As shown below, most small hair dryer manufacturers or importers will not be affected if hand-held hair dryers lacking immersion protection are included in a list of substantial product hazards. To the extent that small manufacturers or importers are affected, the impact is expected to be small.

Background

The voluntary standards for UL 859 *Household Electric Personal Grooming Appliances* and UL 1727 *Commercial Electric Personal Grooming Appliances* call for incorporating a protective device into the hair dryer that reduces the likelihood of electrocution for users with older bathrooms – or other unprotected facilities – that lack ground fault circuit interrupter (GFCI) protection. UL 859 and UL1727 are voluntary standards. However, the Office of Compliance considers any hand-held hair dryer that is not in compliance with the immersion protection requirements of UL 859 or UL 1727 as presenting a substantial product hazard and, consequentially, is subject to recall.

Section 223 of the CPSIA gives the Commission the authority to “specify, by rule, for any consumer product or class of consumer products, characteristics whose existence or absence shall be deemed a substantial product hazard” provided that “such characteristics are readily observable and have been addressed by voluntary standards” and “such standards have been effective in reducing the risk of injury from consumer products and that there is substantial compliance with such standards.”¹⁷ The purpose of the proposed rule the Commission is

¹⁷ “Consumer Product Safety Improvement Act of 2008.” Section 223: Substantial Product Hazard List and Destruction of Noncompliant Imported Products. 122-STAT. 3016 PUBLIC LAW 110-314—AUG. 14, 2008. P 54-55 < <http://www.cpsc.gov/cpsia.Pdf> >

considering is to add hand-held hair dryers to a list of substantial product hazards, which will facilitate in recalling hazardous hand-held hair dryers.

Market Data

The hand-held hair dryer industry is very concentrated with the largest three firms accounting for 92% of industry unit sales.¹⁸ Based on the Small Business Administration Size Standards, an importer is classified as a small business if it has fewer than 100 employees and a manufacturer is classified as a small business if it has fewer than 500 employees. Using this definition, the three largest firms in the industry are not considered small businesses.¹⁹ Besides the largest three firms, most of the remaining firms doing business in this industry are small businesses.

According to the UL Online Directory, in addition to the largest 3 firms, there are approximately 13 firms, which are UL 859 certified to produce hand-held hair dryers.²⁰ The UL Online Directory also lists 10 firms certified to produce UL 1727 hand-held hair dryers. Also, about 42 companies that are not listed in the UL online directory are listed in the ETL Intertek directory as complying with UL 859 standards.²¹ An additional four firms are listed in the ETL Intertek Directory as certified to produce UL 1727 hand-held hair dryers. Based on a review of these firms, all but one appear to be a small business and most firms produce a diverse product line.²² Therefore, it is reasonable to conclude that UL 859 and UL 1727 are widely accepted and that there is significant compliance within the industry.

Other Products Sold and Produced by Small Manufacturers

The typical small firm in the hand-held hair dryer industry will sell a variety of products. For example, according to a CPSC Field Activity Sheet dated October 2008, a small importer selling hair dryers that lacked an immersion protection device also imported other small electrical devices including hair clippers, electric shavers, pedometers, rice cookers, computer memory cards, blood pressure monitors, and hair curlers. Because firms in the hair dryer industry are likely to sell many other products, hand-held hair dryers would only contribute a small amount to the firm's overall revenue.

Small Business Impact

Adding hand-held hair dryers to the list of substantial product hazards under Section 223 of the CPSIA will not have a significant economic impact on a substantial number of small entities. First, most small businesses in the industry already sell products that are either UL 859 or UL

¹⁸ "The Share-of-Market Picture for 2007: Personal Care Appliances." *Appliance Magazine* September 2008. p.42.

¹⁹ U. S. Small Business Administration Table of Small Business Size Standards Matched to North American Industry Classification System Codes

<http://www.sba.gov/idc/groups/public/documents/sba_homepage/serv_sstd_tablepdf.pdf>

²⁰ UL Online Certifications Directory <<http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm>>

²¹ Intertek Directory of Listed Product Search

<[http://etlwhidirectory.etlsemko.com/WebClients/ITS/DLP/products.nsf/\\$\\$Search?OpenForm](http://etlwhidirectory.etlsemko.com/WebClients/ITS/DLP/products.nsf/$$Search?OpenForm)>

²² ReferenceUSAGov <<http://www.Referenceusagov.com>>

1727 listed, and, consequently will not be impacted if hand-held hair dryers without immersion protection are added to a list of substantial product hazards. Second, firms selling products that are not already UL 859 or UL 1727 listed still should have their products meet compliance standards; otherwise their product is subject to recall from the field. In other words, even if an entity sells hair dryers that are not UL 859 or UL 1727 listed, the entity is still obligated to produce up to the voluntary standard or the products in question are subject to the recall under current conditions. Lastly, most small businesses that sell hand-held hair dryers tend to also sell a variety of small electrical products. Therefore, because of diversification in firms' product lines, hand-held hair dryers probably account for only a small proportion of the firms' revenues. Consequently, the Commission could certify that this action will not have a significant economic impact on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

TAB E: Notice of Proposed Rulemaking

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DRAFT 4/21/10

[Billing Code 6355-01-P]
CONSUMER PRODUCT SAFETY COMMISSION

16 CFR PART 1120

Substantial Product Hazard List: Hand-Held Hair Dryers

AGENCY: Consumer Product Safety Commission.

ACTION: Notice of proposed rulemaking.

SUMMARY: The Consumer Product Safety Improvement Act of 2008 (“CPSIA”), authorizes the United States Consumer Product Safety Commission (“Commission”) to specify, by rule, for any consumer product or class of consumer products, characteristics whose existence or absence shall be deemed a substantial product hazard under certain circumstances. In this document, the Commission is proposing a rule to determine that any hand-held hair dryer without integral immersion protection presents a substantial product hazard.

DATE: Written comments in response to this notice must be received by _____
[insert date that is 75 days after publication in the *Federal Register*].

ADDRESSES: You may submit comments, identified by Docket No. [insert CPSC docket number], by any of the following methods:

Electronic Submissions

Submit electronic comments in the following way:

Federal eRulemaking Portal: <http://www.regulations.gov>. Follow the instructions for submitting comments.

To ensure timely processing of comments, the Commission is no longer accepting comments submitted by electronic mail (e-mail) except through www.regulations.gov.

DRAFT 4/21/10

Written Submissions

Submit written submissions in the following way:

Mail/Hand delivery/Courier (for paper, disk, or CD-ROM submissions), preferably in five copies, to: Office of the Secretary, Consumer Product Safety Commission, Room 502, 4330 East West Highway, Bethesda, MD 20814; telephone (301) 504-7923.

Instructions: All submissions received must include the agency name and docket number for this rulemaking. All comments received may be posted without change, including any personal identifiers, contact information, or other personal information provided, to <http://www.regulations.gov>. Do not submit confidential business information, trade secret information, or other sensitive or protected information electronically. Such information should be submitted in writing.

Docket: For access to the docket to read background documents or comments received, go to <http://www.regulations.gov>.

FOR FURTHER INFORMATION CONTACT: Randy Butturini, Office of Hazard Identification and Reduction, Consumer Product Safety Commission, 4330 East-West Highway, Bethesda, MD 20814; telephone (301)504-7562, rbutturini@cpsc.gov .

SUPPLEMENTARY INFORMATION:

A. Background and Statutory Authority

The Consumer Product Safety Improvement Act of 2008 (“CPSIA”) was enacted on August 14, 2008. Pub. Law 110-314, 122 Stat. 3016 (August 14, 2008). The CPSIA amends statutes which the U.S. Consumer Product Safety Commission (“Commission” or “CPSC”) administers, and adds certain new requirements.

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Section 223 of the CPSIA expands section 15 of the Consumer Product Safety Act (“CPSA”) to add a new subsection (j). That subsection delegates to the Commission authority to specify by rule for a consumer product or class of consumer products, characteristics whose presence or absence the Commission considers present a substantial product hazard. Those characteristics must be readily observable, have been addressed by an applicable voluntary standard that has been effective in reducing the risk of injury, and there must be substantial compliance with the voluntary standard. 15 U.S.C 2064(j).

Underwriters Laboratories (“UL”) *Standard for Safety for Household Electric Personal Grooming Appliances, UL 859*, is a voluntary standard that specifies immersion protection requirements for certain household appliances, including hand-held hair dryers. The current immersion protection provisions have been in effect since 1991. *UL Standard for Safety for Commercial Electric Personal Grooming Appliances, UL 1727*, specifies immersion protection requirements for grooming appliances, including hand-held hair dryers, which are “intended for use by qualified personnel in commercial establishments such as beauty parlors, barber shops, or cosmetic studios.” *UL 1727* requires the same integral immersion protection as *UL 859*. Such “commercial” hand-held hair dryers may be consumer products if they are available for sale to, or use of, consumers.

The Commission is proposing a rule to deem any hand-held hair dryer without integral immersion protection, as specified in *UL 859* or *UL 1727*, a substantial product hazard. Hand-held hair dryers, most often used in bathrooms and near water, are subject to accidental immersion during their use. Section 15(a) of the CPSA defines “substantial product hazard” to include, a product defect which (because of the pattern of defect, the

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number of defective products distributed in commerce, the severity of the risk, or otherwise) creates a substantial risk of injury to the public. 15 U.S.C. 1064(a)

On November 25, 2002, CPSC's Director of the Office of Compliance sent a letter to manufacturers and importers of hand-held hair dryers stating that CPSC staff considers hair dryers available for sale to, or use by, consumers to present a substantial product hazard if they do not have immersion protection as required by UL 859. The letter urged manufacturers and importers to assure that their hand-held hair dryers provide immersion protection. The letter noted that "[s]ome firms market hand held hair dryers that they contend are intended for professional use only, that is, for use by professionals in hair salons. However, the staff also considers 'professional' hair dryers that are available for sale to consumers and that fail to provide immersion protection to be defective and to present a substantial product hazard."

B. The Product

A hand-held hair dryer is a portable electrical appliance with a cord-and-plug connection. Typically, they have a big barrel-like body with a pistol grip handle. Frequently, such hair dryers have two control switches or knobs: one turns the unit on and off and may allow the user to adjust the blower speed; the second adjusts the heat setting, often "cool/low/high." Hand-held hair dryers routinely contain open-coil heating elements that are, in essence, uninsulated, electrically energized wires across which a fan blows air. These dryers are typically used in bathrooms near water sources, such as sinks, bathtubs, and lavatories. Being uninsulated, if the heating element were to contact water, an alternative current flow path could easily be created, posing the risk of shock or

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electrocution to the user holding the dryer (or retrieving it after dropping it into a sink, bathtub, or lavatory).

The proposed rule would define “hand-held hair dryer” as “an electrical appliance, intended to be held with one hand during use, which creates a flow of air over or through a self-contained heating element for the purpose of drying hair.”

The characteristics of a hand-held hair dryer with integral immersion protection are readily observable. The power cord of a hand-held hair dryer with integral immersion protection has a large block-shaped plug that incorporates a type of circuit interrupter which is either a Ground Fault Circuit Interrupter (“GFCI”), an Appliance Leakage Circuit Interrupter (“ALCI”), or an Immersion Detection Circuit Interrupter (“IDCI”). The plug usually also has buttons labeled “Test” and “Reset.” If the hair dryer should become wetted or immersed in water enough to cause electrical current to flow beyond normal circuitry, the circuit interrupter will sense the flow and, in a fraction of a second, disconnect the hair dryer from its power source, preventing serious injury or death to a consumer.

An estimated 23 million units of hand-held hair dryers are sold annually. The staff does not know exactly how many companies supply hand-held hair dryers. Sixteen suppliers of hand-held hair dryers are listed in the UL Online Certifications Directory as being in compliance with UL 859. An additional 42 companies are listed in the Intertek ETL Listed Mark Product Directory as complying with the UL 859 standard. Ten firms are listed to the UL 1727 standard on UL’s Online Certifications directory and another four firms are listed in the Intertek ETL Listed Mark Product Directory as being in

compliance with UL 1727. In 2007, the three largest suppliers listed accounted for approximately 92% of domestic hand-held hair dryer sales.

C. The Risk of Injury

The Commission has reports of 104 deaths and 43 electric shock injuries due to hair dryer immersion/ water contact from 1984 to 2004. Of the 104 electrocutions resulting in death, the most incidents (91) occurred during 1984-90 (before the current immersion protection provisions of UL 859 took effect) compared to 12 during 1991-97, and one during 1998-04.

During 1980-86, before the introduction of the initial UL requirements for hair dryers, a total of 110 electrocutions (15.7 annual average) were reported due to hair dryer immersion/water contact. In 1987, UL implemented a change to voluntary standard UL 859 to require immersion protection for hand-held hair dryers if the dryer switch was in the “off” position. During 1987-90, a total of 39 such electrocutions (9.75 annual average) were reported. In 1991, a revision to the UL standard requiring immersion protection in the “off” as well as “on” position took effect. During 1991-97, after the enhanced standard took effect, a total of 12 electrocutions (1.71 annual average) were reported and three electrocutions (0.3 annual average) were reported during 1998-2007, a period when most hair dryers made before 1991 were likely to be out of use. Reporting is ongoing for the years 2006 and 2007.

D. Voluntary Standards

Hand-held hair dryers are included in UL 859, *Standard for Safety for Household Electric Personal Grooming Appliances*. In 1985, UL revised this standard to require protection against electrocution when a hair dryer is plugged into an electrical outlet, with

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its switch in the “off” position, and is immersed in water. The requirement took effect in October 1987. Between 1987 and 1990, the average number of reported deaths from hair dryer immersion/ water contact dropped to approximately 10 deaths per year.

In 1990, the National Electrical Code (NEC) (Article 422-24, 1990 edition) instituted requirements for protection against electrocutions from immersion of hair dryers when the switch is in either the “on” or the “off” position.

In 1987, UL, in keeping with NEC, revised its immersion protection standard to require that “A hand-supported hair-drying appliance (such as a hair dryer, blower-styler, heated air comb, heated air hair curler, curling iron-hair dryer combination, a wall-hung hair dryer or hand unit of a wall-mounted hair dryer, or similar appliance) shall be constructed to reduce the risk of electric shock when the appliance is energized, with its power switch in either the “on” or “off” position, and immersed in water having an electrically conductive path to ground.” This revision, which took effect January 1, 1991, expanded immersion protection to cover the appliance whether the switch was in the “on” or “off” position.

As discussed in section C of this document, the reported incidents of death from immersion-related electrocutions involving hand-held hair dryers significantly declined with implementation of immersion protection requirements in UL 859. The average number of reported hand-held hair dryer electrocutions resulting in death is now less than one per year.

UL 1727, *Standard for Safety for Commercial Electric Personal Grooming Appliances*, originally issued in 1986, was revised to include the same integral immersion

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protection as UL 859 after the full immersion protection requirements in UL 859 proved to be effective. These requirements in UL 1727 became effective March 31, 1994.

E. Recalls

As noted in section A of this document, in November 2002, the director of the Office of Compliance sent a letter to importers and manufacturers of hand-held hair dryers indicating the staff's expectation that such hair dryers should have immersion protection and that the staff would consider them to present a substantial product hazard if they did not. There have been numerous recalls of hand-held hair dryers due to lack of immersion protection. Since January 1, 1991, there have been 30 recalls of hand-held hair dryers due to lack of an immersion protection device. Of these, three occurred during the year 2009.

F. Substantial Compliance

There is no statutory definition of "substantial compliance" in either the CPSIA or the CPSA. Legislative history of the CPSA provision that is related to issuance of consumer product safety standards indicates that substantial compliance should be measured by reference to the number of complying products, rather than the number of manufacturers of products complying with the standard. H.R. Rep. No. 208, 97th Cong., 1st Sess. 871 (1981). Legislative history of this CPSA rulemaking provision also indicates that there is substantial compliance when the unreasonable risk of injury associated with a product will be eliminated or adequately reduced "in a timely fashion." *Id.* The Commission has not taken the position that there is any particular percentage that differentiates substantial compliance from something that is not substantial compliance.

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Rather than any bright line, the Commission has been of the view in the rulemaking context that the determination needs to be made on a case-by-case basis.

The staff estimates sales of hand-held hair dryers are about 23 million units annually. There are 16 suppliers of hand-held hair dryers listed in the UL Online Certifications Directory, and an additional 42 suppliers listed in the Intertek ETL Listed Mark Product Directory as supplying hand-held hair dryers compliant with UL 859. Ten firms are listed to the UL 1727 standard on UL's Online Certifications Directory and another four firms are listed in the Intertek ETL Listed Mark Product Directory as being in compliance with UL 1727.

In 2007, the three largest suppliers listed accounted for approximately 92% of domestic hand-held hair dryer sales. As discussed above, additional suppliers are also listed as supplying hand-held hair dryers that are in compliance with the UL standards. Since the three largest suppliers (which are listed as producing hair dryers that comply with the UL standards) account for 92% of the domestic sales of hand-held hair dryers and additional companies are also listed as producing complying hand-held hair dryers, the staff estimates that over 95% of hand-held hair dryers for sale in this country comply with the UL standards. The Commission, therefore, determines that there is substantial compliance with UL 859 and UL 1727.

G. Effect of Section 15(j) Rule

Section 15(j) of the CPSA allows the Commission to issue a rule specifying that a consumer product (or class of consumer products) has characteristics whose presence or absence creates a substantial product hazard. Placing a consumer product on this substantial product hazard list has certain ramifications. A product that is or has a

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substantial product hazard is subject to the reporting requirements of section 15(b) of the CPSA. 15 U.S.C. 2064(b). A manufacturer who fails to report a substantial product hazard to the Commission is subject to civil penalties under section 20 of the CPSA and possibly to criminal penalties under section 21 of the CPSA. *Id.* 2069 & 2070.

A product that is or contains a substantial product hazard is subject to corrective action under section 15(c) and (d) of the CPSA. *Id.* 2064(c) & (d). Thus, the Commission can order the manufacturer, distributor or retailer of the product to offer to repair or replace the product, or to refund the purchase price to the consumer.

Finally, a product that is offered for import into the United States and is or contains a substantial product hazard shall be refused admission into the United States under section 17(a) of the CPSA. *Id.* 2066(a).

H. Regulatory Flexibility Certification

The Regulatory Flexibility Act (“RFA”) generally requires that agencies review proposed rules for their potential economic impact on small entities, including small businesses. 5 U.S.C. 601-612. As noted in section B of this document above, CPSC has identified 58 suppliers of hand-held hair dryers to the U.S. consumer market which provide products listed to the UL standard. Three large firms supply approximately 92% of the U.S. market share. According to the Small Business Administration Size Standards, these three firms are not small businesses. According to the UL Online Certifications Directory and the Intertek ETL Listed Mark Products Directory, these three firms plus an additional 55 firms are UL listed to produce complying hair dryers. All but one of these 55 firms appears to be a small business. Thus, the overwhelming majority of hair dryers sold in the United States are already UL listed. Since the majority of

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businesses (both large and small) are already in compliance with the voluntary standard, the proposed rule is not expected to pose a significant burden to small business.

Therefore, the Commission certifies that, in accordance with section 605 of the RFA, the rule, if promulgated, will not have a significant economic impact on a substantial number of small entities.

I. Environmental Considerations

A rule determining that hand-held hair dryers without immersion protection in accordance with UL 859 or UL 1727 present a substantial product hazard is not expected to have an adverse impact on the environment and is considered to be a “categorical exclusion” for the purposes of the National Environmental Policy Act according to the CPSC regulations that cover its “environmental review” procedures (16 CFR 1021.5(c)(1)).

J. Paperwork Reduction Act

This proposed rule would not impose any information collection requirements. Accordingly, this rule is not subject to the Paperwork Reduction Act, 44 U.S.C. 3501-3520.

K. Effective Date

The proposed effective date of Part 1120, which declares that any hand-held hair dryer without immersion protection, as specified in UL 859 or UL 1727, is a substantial product hazard, is 30 days from issuance of any final regulation in the Federal Register. Thus, it would apply to hand-held hair dryers imported or introduced into commerce 30 days or more after publication of any final rule in the Federal Register.

L. Preemption

The proposed rule would place hand-held hair dryers without integral immersion protection on a list of products that present a substantial product hazard. The proposed rule does not establish a consumer product safety standard. The preemption provisions in section 26(a) of the CPSA, 15 U.S.C. 2075(a), apply when a consumer product safety standard is in effect. Therefore, section 26(a) of the CPSA would not apply to this rule.

List of Subjects in 16 CFR 1120

Administrative practice and procedure, Consumer protection, Household appliances, Imports, Incorporation by reference.

Therefore, the Commission proposes to amend Title 16 of the Code of Federal Regulations by adding part 1120 to read as follows:

PART 1120 – SUBSTANTIAL PRODUCT HAZARD LIST

Sec.

1120.1 Authority

1120.2 Definitions

1120.3 Substantial product hazard list

Authority: 15 U.S.C. 2064(j).

§ 1120.1 Authority.

Under the authority of section 15(j) of the Consumer Product Safety Act (CPSA), the Commission determines that consumer products or classes of consumer products

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listed in § 1120.3 have characteristics whose existence or absence presents a substantial product hazard under section 15(a)(2) of the CPSA. The Commission has determined that the listed products have characteristics that are readily observable and have been addressed by a voluntary standard, that the voluntary standard has been effective, and that there is substantial compliance with the voluntary standard. The listed products are subject to the reporting requirements of section 15(b) of the CPSA and to the recall provisions of section 15(c) and (d) of the CPSA, and shall be refused entry into the United States under section 17(a)(4) of the CPSA.

§ 1120.2 Definitions.

The definitions in section 3 of the Consumer Product Safety Act (15 U.S.C. 2052) apply to this part 1120.

(a) *Substantial product hazard* means a product defect which (because of the pattern of defect, the number of defective products distributed in commerce, the severity of the risk, or otherwise) creates a substantial risk of injury to the public.

(b) *Hand-held hair dryer* means an electrical appliance, intended to be held with one hand during use, which creates a flow of air over or through a self-contained heating element for the purpose of drying hair.

§ 1120.3 Products deemed to be substantial product hazards.

The following products or class of products shall be deemed to be substantial product hazards under section 15(a)(2) of the CPSA.

(a) Hand-held hair dryers that do not provide integral immersion protection in compliance with the requirements of section 5 of Underwriters Laboratories (UL) *Standard for Safety for Household Electric Personal Grooming Appliances*, UL 859-

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2007, 10th Edition, approved March 21, 2007, or section 6 of *UL Standard for Safety for Commercial Electric Personal Grooming Appliances, UL 1727, 4th Edition, approved March 25, 1999*. The Director of the Federal Register approves these incorporations by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. You may obtain a copy from UL, Inc., 333 Pfingsten Road, Northbrook, IL 60062. You may inspect a copy at the Office of the Secretary, U.S. Consumer Product Safety Commission, Room 502, 4330 East West Highway, Bethesda, MD 20814, telephone 301-504-7923, or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to:

http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.

Dated: _____

Todd Stevenson, Secretary
U.S. Consumer Product Safety Commission