UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, DC 20207

Memorandum

Date: September 19, 2001

TO : Allyson Tenney
Directorate for Engineering Sciences

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

Russ Roegner, Ph.D., Director RR
Division of Hazard Analysis

FROM : Signe Hiser, M.S. SRH
Division of Hazard Analysis

SUBJECT : Candle Fires Pilot Study Summary

Residential fires in which a candle is the source of heat of ignition is one of the few segments of the fire problem that has been increasing in recent years. The U.S. Consumer Product Safety Commission (CPSC) has begun working with the American Society for Testing and Materials (ASTM) to develop voluntary standards for candles. In 1998, there were an estimated 12,800 candle fires that resulted in 170 deaths and 1,200 injuries [1].

The purpose of the candle pilot study was to assess the level of detail that could be obtained using the Candle Fire and Fire Hazard Investigation Guideline in conjunction with cases learned about through certain fire departments that CPSC has collaborated with in the past. Examples of the level of detail we wished to achieve were: type of candle, physical properties of the candle and candle holder (i.e. shape, size, color, fragrance, presence or absence of objects embedded within the candle, etc.) brand information, purpose for candle use, and if candle malfunction contributed to the cause of the fire. This data collection was meant to help identify the products involved, their characteristics, and how they were being used. CPSC was also interested in collecting candle samples from these fires.

The goal of the candle study was to investigate 100 cases or collect cases until March 31, 2001. From August, 2000 through March, 2001 eighty-three cases were assigned and 79 were completed and considered in-scope. The four cases not considered in-scope involved one case in which the ignition source was either a candle or matches but could not be confirmed, one fire that was intentionally set, and two other cases that were purged. The results of these 79 in-depth investigations along with injury data from 1991 through 2000 are presented in this memorandum.

Methods

In-depth Investigations

In-depth investigations were conducted by CPSC field staff to gather detailed information on candle fires. It is noted that while the cases investigated in the pilot study were limited in number and were not from a national sample with a known selection probability, they provided useful information about the hazard scenarios associated with candle fires.

CPSC Regional Field Offices and Satellite Offices were involved in the data collection effort. Investigation data in this report include the 79 cases that were completed and considered in-scope during the pilot study on candle fires between August, 2000 and March, 2001. Investigators were assigned the responsibility of case identification and follow-up investigations of in-scope incidents. Contacts were developed with the local fire departments to arrange for rapid identification of fires that were in-scope, i.e., non-arson residential structure fires in which the form of heat of ignition was a candle. If the candle was available, the sample was collected.

Injury Estimates

The U.S. Consumer Product Safety Commission's National Electronic Injury Surveillance System (NEISS) collects data on injuries treated in hospital emergency rooms via a probability sample of hospitals across the United States and its territories. Each NEISS hospital codes all of the product-related injuries that are treated in its emergency room. The NEISS injury estimates and injury rates presented in this memorandum are based on product code 463, candles, candlesticks and other accessories. To evaluate the presence of a trend in the estimates, linear regression was used taking into account the variance/covariance matrix from year to year.

For the years 1991 through 2000, the direct method of adjustment was used to calculate the age-adjusted injury rates presented in this memorandum with the 2000 U.S. resident population as the standard [2]. Direct adjustment entails weighting annual age-specific rates (i.e., crude rates within specific age groups) by the distribution of the standard population (refer to the appendix for details). Regression analysis was then used to analyze the presence or absence of trends in the data.

Results

In-depth Investigations

The aim of the pilot study was to assess the Candle Investigation Guideline, the level of detail CPSC could gather working in cooperation with fire departments, and to collect as many candle samples as possible. Unfortunately, candle samples could be collected in only 9 of the 79 investigations. Typically, due to the magnitude of the fires, most of the candles were consumed in the fire. The severity of the fires often prevented CPSC and

fire department investigators from determining all the fire scenario details we hoped to discover.

Table 1 gives a breakdown of the types of scenarios that caused the candle fire. The close proximity of combustible material was sited as the cause for 26 of the 79 fires. Examples of these types of incidents include a curtain contacting the candle flame and paper from a printer falling onto the flame. Unfortunately, no further information was available on many of the incidents in which combustibles close to the candle was noted as the cause of the fire. Some of these incidents may have been candles that burned down and then ignited the nearby combustibles, or they may have tipped over to ignite the nearby items, but no further detail could be obtained because the event was not witnessed and the damage was often extensive. Stability was an issue in 5 of the incidents in which candles fell over and caused fire (2 pillars, 1 taper, and 2 unknown type). Candles being knocked over by pets (5 incidents), consumers (4 incidents), and wind (1 incident) also started several fires. Children playing with candles were responsible for 3 of the fires and candles that burned down and ignited nearby objects caused 2 fires. There were 2 cases in which the exact ignition source was thought to be a candle but a lighter or matches could have also been the culprit. The exact cause of the candle fire was unknown in 24 of the cases.

Table 1. Candle Fire Incident Scenarios

Incident Scenario	Frequency
Total	79
Combustibles close	26
Fell over	5
Knocked over (1 wind)	5
Pet knocked over	5
Child play	3
Burned down	2
Candle or lighter/matches	2
Pillow/paper fell on candle	2
Glass container broke	1
Consumer's clothing ignited	1
Filling oil candle while lit	1
Gas fumes caught fire	1
Pet knocked over or fell over*	1
Unknown	24

*The exact cause of the fire in this case was determined to be either a pet knocking over the candle or the candle falling over on its own.

As seen in Table 2, filled candles were most often responsible for the candle fires in this pilot study. Pillar and column candles were also involved in a number of incidents followed by taper/dinner candles, freestanding (possibly pillar, container) and votives, and air freshener candles and tealights. The type of candle was unknown in 31 cases.

Table 2. Type of Candle

Candle Type	Frequency
Total	79
Filled	13
Pillar/column	12
Dinner/taper	7
Freestanding	4
Votive	4
Air freshener	2
Tealight	2
Fumigator	1
Oil	1
Religious	1
Birthday or taper	1
Unknown type	31

Among the 34 cases in which candle fragrance characteristics were known, 27 were scented candles, 6 did not have any added fragrance, and 1 was a fumigator candle used to eliminate pests from the home.

Table 3. Scent Characteristics

Scented	Frequency
Total	79
Yes	27
No	6
Sulfur fumigator	1
Unknown	45

The pilot study found that many consumers use candles because they enjoy the home fragrance properties of scented candles. Candles are often frequently used for religious purposes, for light, and for aromatherapy. Ambience and heat were also mentioned as reasons for candle use.

Table 4. Reason for Candle Use

Reason used	Frequency
Total	79
Fragrance	15
Religious	8
Light	7
Aromatherapy	3
Ambience	2
Heat	2
Other	4
Unknown	38

When consumers were asked how often they used candles, 12 of the 25 respondents stated that they used candles on a daily basis and 10 of the respondents used candles an average of one or more times each week. Only three respondents said they used candles 1 or more times a month or only on special occasions or holidays.

Table 5. Frequency of Candle Use

How often used	Frequency
Total	79
Daily	12
1+ times/week	10
1+ times/month	2
Only special occasions/holidays	1
Unknown	54

The bedroom was the room in which most candle fires originated (41 out of 79 incidents). Twelve of the candle fires began in the living room. Candle fires also commonly occurred in basements, bathrooms, and kitchens.

Table 6. Room in Which the Candle was Used

Room used	Frequency
Total	79
Bedroom (incl. 1 attic bedroom)	41
Living room	12
Basement	4
Bathroom	4
Kitchen	4
Studio apartment	3
Storage room/closet/attic	3
Garage	2
Entertainment/play room	2
Other	1
Home Office	1
Porch	1
Unknown	1

The candles responsible for the fires in the pilot study were most often placed on tables, dressers, and nightstands.

Table 7. Surface on Which the Candle was Placed

Surface placed	Frequency
Total	79
Table	10
Dresser	8
Nightstand	8
Bookcase/cabinet/shelf	5
Coffee table/end table	5
Held by child	3
Floor	2
Bed	2
Plastic bin/crate	2
Desk	1
Air conditioner	1
Television	1
Eave	1
Suitcase	1
Entertainment center	1
Toilet	1
Metal pedestal	1
Unknown	26

The consumer was at home at the time the fire started in over half of the incidents. In about a quarter of the cases the consumer was not at home and in slightly less than a quarter of the cases it is not known whether or not the consumer was at home.

Table 8. Presence of the Consumer in the Home at the Time of the Incident

	Frequency
Total	79
Home	44
Not at home	19
Unknown	16

Even if a consumer was in the home at the time of the incident, often they were not in the room of fire origin when the incident occurred. The consumer was in the room at the moment of ignition in only 9 of the known incidents.

Table 9. Presence of the Consumer in the Room at the Moment of Ignition

Attended (in same room)	Frequency
Total	79
Yes	9
No	53
Unknown	17

Candles ignited a variety of household items in the residential fires involved in this pilot study. Bedding was most commonly ignited by candles in the pilot study followed by paper/cardboard and clothing. Flooring materials, couches, curtains, mattresses, and flammable liquids/fumes were also among the objects that first ignited.

Table 10. Object Ignited by the Candle

Object ignited	Frequency
Total	79
Bedding	14
Paper/cardboard	10
Clothing	7
Carpet/rug/baseboard	4
Couch	3
Curtain	3
Mattress	3
Flammable liquid/fumes	3
Dresser	2
Table	2
Air conditioner	1
Book	1
Candle holder	1
Furniture	1
Nightstand contents	1
Rags	1
Stuffed animal	1
Suitcase	1
Tablecloth	1
Television	1
Toilet paper holder	1
Towel	1
Wicker stand	1
Windowsill	1
Wood shelf	1
Wood scraps	1
Unknown	12

It was often unknown how long the candle had been burning prior to the ignition of the fire. However, 10 of the candle fires occurred after the candle had been left burning thirty minutes or less and another 7 fires started after the candle had been burning between 30 minutes and an hour and a half.

Table 11. Amount of Time the Candle was Burning Prior to the Incident

Burning Time	Frequency
Total	79
30 minutes or less	10
31 minutes to 90 minutes	7
5 to 6 hours	2
Unknown	60

Injury Estimates

Injuries associated with candles have increased from 5,330 in 1991 to 13,080 in 2000. Regression analysis on the NEISS injury data for all candle-related injuries for this 10-year period shows that the increase in candle fire injuries is significant ($p < 0.001$). Age-adjusted injury rates have also experienced a significant increase since 1991 ($p < 0.001$).

Table 1. Candle-Related Injuries and Age-Adjusted Injury Rates

Year	Estimated Candle-Related Injuries	Estimated Candle-Related Age-Adjusted Injury Rate per 100,000
1991	5,330	2.09
1992	5,750	2.24
1993	6,100	2.35
1994	6,440	2.46
1995	7,180	2.73
1996	8,580	3.23
1997	8,960	3.34
1998	10,730	3.97
1999	13,080	4.80
2000	13,080	4.76

Sources: Injury data from the U.S. Consumer Product Safety Commission's National Electronic Injury Surveillance System file. US Resident Population data from the U.S. Census Bureau [2,3]. Age-adjusted rates use the 2000 U.S. resident population as the standard [2].

References

1. Mah, J. (2001). 1998 Residential Fire Loss Estimates. Consumer Product Safety Commission, Directorate for Epidemiology, Washington, DC 20207.

2. Anderson, R.N. and Rosenberg, H.M. Age Standardization of Death Rates: Implementation of the Year 2000 Standard. Centers for Disease Control and Prevention and the National Center for Health Statistics, Volume 47, Number 3, October 1998.

3. U.S. Census Bureau. Statistical Abstracts of the United States. 2000, No. 12, Resident Population by Age and Sex: 1980 to 1999, <http://www.census.gov/prod/2001pubs/statab/sec01.pdf>.

Appendix

Year	2000 Standard Weight	1991 Population	1991 Candle Inj	Age-adjusted Inj Rate per 100,000	Crude Inj Rate
Total	1.000000	252,153,000	5332	2.0894085595	2.1145891582
New Under 5	0.069135	19,189,000	1147	0.4132463651	
New 5 to 14	0.145565	35,884,000	1220	0.4948982834	
New 15 to 64	0.658913	165,302,000	2720	1.0842236392	
New 65 + Older	0.126387	31,779,000	244	0.0970402719	

Year	2000 Standard Weight	1992 Population	1992 Candle Inj	Age-adjusted Inj Rate per 100,000	Crude Inj Rate
Total	1.000000	255,030,000	5753	2.2432959255	2.2558130416
New Under 5	0.069135	19,492,000	797	0.2826831264	
New 5 to 14	0.145565	36,395,000	842	0.3367652974	
New 15 to 64	0.658913	166,847,000	3655	1.4434344130	
New 65 + Older	0.126387	32,295,000	461	0.1804130887	

Year	2000 Standard Weight	1993 Population	1993 Candle Inj	Age-adjusted Inj Rate per 100,000	Crude Inj Rate
Total	1.000000	257,783,000	6101	2.3537232038	2.3667192949
New Under 5	0.069135	19,674,000	854	0.3000980482	
New 5 to 14	0.145565	36,950,000	1054	0.4152246549	
New 15 to 64	0.658913	168,344,000	3686	1.4427323326	
New 65 + Older	0.126387	32,813,000	508	0.1956681681	

Year	2000 Standard Weight	1994 Population	1994 Candle Inj	Age-adjusted Inj Rate per 100,000	Crude Inj Rate
Total	1.000000	260,327,000	6443	2.4594788717	2.4749641797
New Under 5	0.069135	19,700,000	989	0.3470787563	
New 5 to 14	0.145565	37,468,000	868	0.3372222163	
New 15 to 64	0.658913	169,947,000	4129	1.6008824969	
New 65 + Older	0.126387	33,211,000	458	0.1742954021	

Appendix

Year	2000 Standard Weight	1995 Population	1995 Candle Inj	Age-adjusted Inj Rate per 100,000	Crude Inj Rate
Total	1.000000	262,803,000	7179	2.7309990387	2.7317039760
New Under 5	0.069135	19,532,000	726	0.2569732234	
New 5 to 14	0.145565	37,949,000	1568	0.6014543730	
New 15 to 64	0.658913	171,702,000	4621	1.7733264452	
New 65 + Older	0.126387	33,620,000	264	0.0992449970	

Year	2000 Standard Weight	1996 Population	1996 Candle Inj	Age-adjusted Inj Rate per 100,000	Crude Inj Rate
Total	1.000000	265,229,000	8580	3.2334896233	3.2349403723
New Under 5	0.069135	19,292,000	1059	0.3795042764	
New 5 to 14	0.145565	38,443,000	1384	0.5240536899	
New 15 to 64	0.658913	173,538,000	6054	2.2986661723	
New 65 + Older	0.126387	33,956,000	84	0.0312654847	

Year	2000 Standard Weight	1997 Population	1997 Candle Inj	Age-adjusted Inj Rate per 100,000	Crude Inj Rate
Total	1.000000	267,784,000	8959	3.3409771692	3.3456069071
New Under 5	0.069135	19,099,000	1378	0.4988116132	
New 5 to 14	0.145565	38,851,000	1380	0.5170515559	
New 15 to 64	0.658913	175,648,000	6001	2.2511710427	
New 65 + Older	0.126387	34,185,000	200	0.0739429574	

Year	2000 Standard Weight	1998 Population	1998 Candle Inj	Age-adjusted Inj Rate per 100,000	Crude Inj Rate
Total	1.000000	270,248,000	10728	3.9686015176	3.9696871022
New Under 5	0.069135	18,989,000	1457	0.5304633999	
New 5 to 14	0.145565	39,171,000	1613	0.5994137117	
New 15 to 64	0.658913	177,702,000	7514	2.7861657618	
New 65 + Older	0.126387	34,387,000	143	0.0525586443	

Appendix

Year	2000 Standard Weight	1999 Population	1999 Candle Inj	Age-adjusted Inj Rate per 100,000	Crude Inj Rate
Total	1.000000	272,691,000	13,083	4.7975778498	4.7977380992
New Under 5	0.069135	18,942,000	1724	0.6292299652	
New 5 to 14	0.145565	39,495,000	2362	0.8705520446	
New 15 to 64	0.658913	179,714,000	8750	3.2081466942	
New 65 + Older	0.126387	34,540,000	245	0.0896491459	

Year	2000 Population	2000 Candle Inj	Crude Inj Rate
Total	274,634,000	13,084	4.7641588441
New Under 5	18,987,000		
New 5 to 14	39,977,000		
New 15 to 64	180,960,000		
New 65 + Older	34,710,000		

Investigation Guideline

Appendix 121
April 17, 2000

CANDLE FIRES AND FIRE HAZARDS

I. INTRODUCTION

Use this guideline as an aid for the conduct of investigations of candle fires. The data collected may be drawn from a variety of sources, for instance, from: interviews, news clips, fire investigation reports, other official reports, and other relevant materials. Attach supporting documents and the data record sheet to the Epidemiologic Investigation Report Form 182 along with the narrative. CPSC staff is interested in obtaining samples of candles that have caused fires.

The purpose of this investigation is to learn more about the characteristics of the candles that start fires and the circumstances under which candle fires occur. Clearly, the causes of candle fires are many and varied, but in general, most candle fires result from either a physical malfunction on the part of the candle or from a miscalculation on the part of the user. We are interested in data that capture (1) the physical characteristics of the candle's performance and (2) the user's interaction with the candle. We are interested in any features or situations that are relevant to understanding the cause of the fire.

Please remember that no guidelines can cover all the pertinent factors that may apply to a particular incident. Include an explanation of any relevant factors in your narrative, even when these factors have not been specifically mentioned in the guidelines.

A. Background Information

Data from the National Candle Association show that the use of candles in the home has increased dramatically over the last 10 years. Not only have candles experienced an increase in popularity, but the types of candles available on the market and their proposed uses have increased at a staggering rate. Candles are no longer intended for use only as interior decorating items, but are now marketed as art items, air cleaners, therapy and meditation devices, fragrance disseminators, and so forth.

Not surprisingly, the number of residential fires attributed to candles has also increased. According to 1996 data[1], there were over 10,000 residential fires caused by candles. In 1996, about 1,150 injuries resulted from candle fires and about 120 lives were lost in fires started by candles. Property loss due to these fires was about 175.9 million dollars. While the number of total residential fires has been steadily decreasing, the number of candle fires has, nonetheless, been steadily increasing.

At present, there are no industry standards or regulations for candles.

It is essential that we get a full and complete description of the scenario in which the candle fire occurred and any factors that contributed to the fire. We are interested in how much attention was paid to the candle and whether there were people in the room with the candle the entire time or whether the people were in another room or some other part of the house when the fire broke out. We are interested in how close the candle was to other things that could catch fire. More precisely, we want to know exactly where the candle was placed and what other objects were around the candle and how close they were to the candle. We have asked for more in-depth information about "combustibles" and whether or not a candle was "attended" rather than including these issues as items in the Data Record Sheet, as these terms elude precise and consistent definition and ultimately end up meaning different things to different people.

B. Product Description

The American Society for Testing and Materials (ASTM) defines a candle as "one or more combustible wicks supported by a material that constitutes a fuel which is solid, semi-solid, or quasi-rigid at room temperature, 68° to 80° F (20 to 27° C); it can also contain additives that are used for color, odor, stability, or to modify the burning characteristics; the combined function of which is to sustain a light-producing flame."[2] Traditionally, a candle is cylindrical, but today's candles come in many fanciful designs and shapes. The current market is producing a vast variety of products that deviate from the traditional concept of a candle. We are interested in all products comprised of wax and/or oil and that are burned with a wick.

Types of Candles:

- **Taper or dinner candle:** Long and thin, varies from 6 to 18 inches in length and can burn up to 12 hours. Usually they are not scented, may be drip-resistant, and produce little smoke

[1] Ault, K. Singh, H., and Smith, L. (1998), *1996 Residential Fire Loss Estimates,* Bethesda, MD: Directorate for Epidemiology and Health Safety, U.S. Consumer Product Safety Commission.
[2] ASTM Standard F1972 – 99, Standard Guide for Terminology Relating to Candles and Associated Accessory Items.

or soot. Tapers are available in many colors. (ASTM definition: a slender candle produced to be used with a candle accessory for support.)

- **Freestanding Candle:** ASTM definition: a rigid candle (that is, pillar-shaped, column-shaped, or figurine) recommended to be used on a heat-resistant, nonflammable surface or on a candle accessory.
    - **Pillar or column candle:** Thick in diameter. The shorter pillar candles can stand on their own without the assistance of a candle holder/accessory, but should always be used with a candle holder/accessory.
    - **Jumbo Pillars:** These are thick, sturdy, and larger than pillar or column candles. Sometimes called colonnades, these candles have multiple wicks (as many as three to five). They are often scented and can have very long burning times.
- **Votive candles:** Small candles that must be burned in a container since the wax melts at low temperatures and creates a pool of molten wax. Votive candles were originally used for religious or ceremonial purposes. (ASTM definition: a candle produced for use fully within a candle accessory, specifically, a votive holder.)
- **Tealight candle:** Small candles that come in their own metal holders to retain the melted wax. Traditionally used to keep teapots warm, tealights are now used with a variety of products. Potpourri burners are one example. (ASTM definition: a cylindrical filled candle produced with a diameter and height of approximately 1.5 in. (38 mm) and 0.75 in. (19 mm) respectively.)
- **Filled candles:** Decorative and highly scented candles poured into various glass, tin, or pottery pieces, called containers. (ASTM definition: a candle produced and used within the same vessel.)
- **Gel candles:** Some are clear and transparent taper style, while others come in containers. Some gel candles have objects imbedded in the gel, for instance, wood or plastic objects, seashells, or candy. (ASTM definition: a candle where the primary fuel is a liquid, such as mineral oil, terpene type chemicals, or modified hydrocarbons that are not mineral oil based, which may or may not contain organic functional groups; it also contains a chemical agent to increase the viscosity (thicken) to a point where the candle has a quasi-rigid property.)

- **Citronella:** These are scented candles that have oversized wicks to prevent the flame from extinguishing in a breeze. They produce an odor and smoke that deter insects and are for outdoor use only. (The insect repellent quality of citronella candles is regulated by the EPA, but CPSC has jurisdiction over the burning properties of the candle itself)

- **Novelty:** There are many candles that do not fit into the above categories. For instance, wax bead candles; oil and water candles that are similar to oil lanterns in which only the oil/wax substance floats in a bed of water. Candles shaped like objects: cars, mushrooms, etc.; seasonal candles, such as, Halloween candles depicting scary sights; Christmas decoration candles, and so forth also can be classified as novelty candles.

Candle container vs. candle accessory/holder:

- **Candle Containers:** Some candles come in an encasement that is commonly called a "container." Candle containers are made of metal, glass, or plastic and completely cover the bottom and sides of the candle, leaving only the wick and the top of the candle exposed. Examples of candles in containers are votive candles and tealights. Votive candles can be sold in a glass encasement, but many are sold without any container at all. Nevertheless, even the votives that are sold without a container are intended for use with a container. A tealight usually comes in a small metal cup.

- **Candle Accessory/Holder:** On the other hand, a candle holder is something that a candle is placed in. It usually has a hollowed out portion on the top so the candle is sunk into the candle holder by about ½ inch to 2 inches. A candle holder does not encase the entire candle, and covers only a few inches of the bottom portion. Candle holders can be very narrow to accommodate thin candles like tapers or very wide to accommodate larger candles like columns or pillars. Candle holders come in a variety of shapes and sizes and often have a novelty or decorative function.

C. Specific Items of Interest

CPSC staff wants to learn as much as possible about the physical candle and the *circumstances that led to the fire. Collect the fire candle and identical exemplars. Collect the* actual candle label if possible, or photograph the label if available.

Candle malfunctions should be described in as much detail as possible. "Candle malfunction" is used in a broad sense to encompass all aspects of the candle's functioning, including the candle holder and the candle container. A candle malfunction could be anything from a flame that flares up (i.e., flames that are excessively tall or large), to wax that runs and transfers flame to other objects, or candle holders that catch fire, or candle containers (the encasement

the candle is manufactured in) that crack, explode, ignite, or overheat so that other objects ignite. There are many other ways for candles to malfunction, and the above are a few selected for illustration.

One of the main focuses of this study is charting the course that led to the fire, and especially the degree to which the candle was monitored or under surveillance. How the user interacted with the candle is of interest; determine whether he/she followed the instructions on the label (if there was one), describe the environment where the candle was burning, and whether any occupants were in the room with the candle when the fire started.

If a wall covering was ignited by a candle, collect a sample of the wall covering as well.

D. Headquarters Contacts

Signe Hiser, EPHA, 301 504-0470, ext. 1258, shiser@cpsc.gov
Linda Smith, EPHA, 301 504-0407, ext. 1275, lsmith@cpsc.gov

II. Instructions for Collecting Specific Information

A. Synopsis

Write a synopsis of the sequence of events that occurred prior to, during, and subsequent to the fire. Specify the source of the ignition, the products involved, the extent of damage, and the nature of all injuries and deaths.

B. Description of the Incident Environment

PRE-INCIDENT: Describe the home/residence where the candle fire occurred.

Describe the sequence of events that led up to the fire. Describe the course of activities directly prior to the candle's being lighted and the course of events directly prior to the fire breaking out. Include the candle's placement in the environment, for instance, the room the candle was in, how close the candle was to the nearest object or material (if on a shelf, how close to next shelf, etc., on a table, how close to other objects and materials, etc.).

Also include the reason the candle was in use, for instance, used as a light source, used as a therapy, or used for decorative/ambience reasons.

Investigation Guideline

INCIDENT: Describe the cause of the candle fire. Determine exactly what happened to precipitate the fire. Describe the way the fire unfolded.

- Did anyone witness the fire event? Was anyone in the room with the candle when the fire started? Did anyone enter the room when the fire was already in progress?

- Was the candle involved in an accident (something interfered with candle's functioning), for example: candle dropped or knocked over, person or draft transferred flame to other objects and materials, etc.?

- Was a child or children playing with the candle and started the fire? If so, include the age(s) of the child(ren) and whether or not there was adult supervision.

- Once the fire started, did the user try to extinguish the fire him/herself? If so, how successful was the attempt? What means did he/she use to extinguish the fire? And, was the fire department called? Did the fire department respond? If so, what was the extent of the fire department's involvement?

POST-INCIDENT: Describe any damage done to the area where candle was located, e.g., burn marks, scorched top, blistered top, etc.

- Recount who was injured and how badly. Did anyone require hospital care? Was anyone permanently injured? Did anyone die?

- How severe was the property damage and loss? Please provide an estimated dollar value for destroyed or damaged property and possessions and the source of the estimate.

C. Description of Interaction Between Injured Person(s) and Product

- Did the candle have a label with instructions for use?
  - If so, what can the user remember about the label?
  - Did the user follow the instructions commonly given on the label about the proper use of the candle, for instance:
    - trim the wick,
    - keep the candle out of a draft,
    - not let the candle burn for more than four consecutive hours, and
    - not let the candle burn lower than ½ inch?
- Was a match stem or any wick debris left in the candle after it was lighted?

Investigation Guideline

- Determine the degree to which the candle was monitored.
  - For instance, where were the people in relation to the candle?
  - Was anyone within sight of the candle?
  - What was going on at the time of the fire?
  - Describe any other people in the vicinity and generally, what they were doing prior to the fire.
  - If no one was monitoring the candle, was it because the user assumed:
    - the candle would burn safely,
    - candle's surroundings were safe,
    - there was no perceived danger, or
    - simply forgot.
- If the candle was monitored when the fire broke out, explain the circumstances surrounding the incident.

D. Description of User and Injured Persons

- Please record the age, sex, and general health of the user and injured persons.
- Briefly describe the treatments the injuries required and whether any permanent injuries were incurred.

E. Description of Product

(Full description of the physical candle taken on the data record sheet.)

- Was the candle part of a decoration? If so, please describe the decoration. What other materials were part of the decoration?

- How did the household use the candle? Describe use patterns and characteristics.

- If a multiwick candle, had the wicks migrated closer to each other or farther apart from each other? Did wick or wicks migrate closer to holder?

- Describe the surface the candle was placed on (even if candle was in a holder), for instance: kitchen countertop, wooden shelf, ceramic bath fixture, glass shelf, dining room table, coffee table, end table, on top of television, on top of magazines, etc.

- Did the user notice any unusual characteristics of the way the candle burned? For instance, was: the flame excessively high (greater than two inches)?

- If the user did not notice any irregular burning characteristics, did the candle function properly, did it burn cleanly and smoothly?

- Was the candle in a candle holder when purchased? If so, did the candle holder malfunction in any way (e.g., paint or surface coating ignite; candle holder overheat and ignite other materials; etc.)? If so, at what point in the fire sequence? What were the dimensions of the candle holder (i.e. type/size of base, length, etc.)?

- Did the consumer use their own candle holder?

- If the candle was in a container (i.e., the encasement that the candle was manufactured in), did something happen to the container that contributed to the fire?

F. Product Safety Standards

At present, there are no product safety standards for candles.

III. Photographs/Diagrams of Incident Scene

If the user still has the candle remnant, conduct an on-site investigation. Obtain photographs of the candle and the area surrounding the candle. If the user took pictures or videotapes of the candle while it was malfunctioning, obtain copies of those pictures or videotapes. Diagram the room where the candle was being used, if possible.

IV. Obtaining Samples and Documents Related to the Investigation

Collect the remaining part of the candle (and candle holder if possible) that started the fire and obtain three exemplar candles, preferably ones the user purchased at the same time. Obtain copies of the fire incident report and any other investigative reports of the incident.

If wall coverings ignited in the fire, collect a sample that measures 12x12 inches.

V. Coroner's Report and Death Certificate

In cases that involve a death or deaths, procure the coroner's report and the death certificate.

Investigation Guideline

DATA RECORD SHEET FOR CANDLE FIRES

1. Task number _____
2. Date of fire _____
3. What is the age of the user?
   - < 10 [ ]
   - 10 – 14 [ ]
   - 15 – 19 [ ]
   - 20 – 64 [ ]
   - 65 – 74 [ ]
   - 75 + [ ]
   - Unknown [ ]

4. Type of Candle, describe the candle and it's size in a few words:
   a. taper: length _____ diameter _____
   b. pillar or column: length _____ diameter _____
   c. votive or tealights: describe candle size and the holder _____
   _____
   d. novelty candle: _____
   e. filled candle: describe both candle and container/jar _____
   _____
   f. gel: _____
   g. other: _____

5. Characteristics of the candle (may have multiple characteristics), describe in a few words:
   a. brand _____
   b. scent _____
   c. hand-made _____
   d. oil & water _____
   e. spirals _____
   f. beeswax _____
   g. made from wax beads _____
   h. citronella _____
   i. color _____
   j. single or multiwicks, give number of wicks _____
   k. shape _____
   l. decorative objects embedded in candle _____
   m. decorative objects embedded around candle _____
   n. gel _____
   o. regular "wax" candle _____
   p. other, specify _____

Investigation Guideline

6. Was the bottom of the wick anchored with a metal tab? _____

7. Did the candle come from the manufacturer in a candle holder? _____
   If yes, describe the candle holder (metal, wood, glass, plastic, decorative, plate, ceramic, resin, etc.)
   _____

8. Did you put the candle in your own holder? _____
   If yes, describe the holder _____

9. Do you remember whether the candle had a label? _____
   If yes, what did it say? (If label available, get pictures.) _____
   _____

10. Where was the candle purchased? _____

11. What is the name and manufacturer of the candle? _____

12. What did the candle cost? _____

13. Was the candle part of a set that included other items? Describe: _____
   _____

14. After the candle was acquired, how long before it was first used by the household? _____
   _____

15. Was this the first time the candle had been used? _____

16. How long had the candle been burning when this incident occurred? _____

17. Did the candle burn all the way down? _____

18. When using the candle, did you notice that it:
   a. flared up? _____
   b. produced excessive smoke? _____
   c. produced a sooty residue? _____
   d. showed signs of uneven burning? _____

19. Did some part of the candle ignite (object or material in wax; paint or color on outside of candle)?
   _____

Investigation Guideline

20. Did the candle burn smoothly and cleanly? _____

21. What did the user do to try to extinguish the fire? _____
_____

22. Did any spilled wax catch fire, or spread the fire? _____
_____

23. In what room was the candle being used?_____

24. On what surface was the candle placed (e.g. coffee table, TV, kitchen counter)?_____
_____

25. For what purpose was the candle being used (e.g. ambiance, light, fragrance, religion)____
_____

26. Was there a smoke detector in the home?_____
a. if yes, where was it? _____
b. did it sound an alarm? _____

27. Was there a sprinkler system in the home?_____
a. if yes, did it operate? _____

28. How often did you or anyone in the household burn candles (give total for entire household):
a. daily [ ]
b. once a week or more [ ]
c. once a month or more [ ]
d. only at special or holiday occasions [ ]
e. never [ ]

29. What is the household's annual income?
a. less than $15,000 dollars [ ]
b. between $15,000-$34,999 dollars [ ]
c. $35,000 dollars or greater [ ]
d. don't know [ ]

30. What is the user's highest level of education attained and that of spouse/partner (if there is a spouse or partner)? _____
_____

Investigation Guideline

Comments