LAW ENFORCEMENT MANAGEMENT INSTITUTE

FIRE SCENE INVESTIGATION: A GUIDE FOR POLICE AND FIRE INVESTIGATORS

A LEARNING CONTRACT

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OF THE REQUIREMENTS FOR

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TABLE OF CONTENTS

LIST OF TABLES

INTRODUCTION

As stated in a previous paper written by this author, the lack of fire investigative training on the part of police officers often allows the crime of arson to go undetected and unreported.

Arson is the iceburg crime--its mention in the police logs and fire records of our nation represents only a tip visable above the surface. It is a crime believed to be much more prevelent than statistics would indicate. Why? Because of less-than-perfect systems of reporting fires and determining their cause. Many fires wind up classified as of unknown origin; some deliberately-set fires are mistakenly attributed to accidental causes; and many fires, some of them arson, are never reported by local authorities to state and national record-keeping agencies.[1]

Visable or not, arson is none-the-less a crime--a felony in fact. Statistics on confirmed arson fires alone indicate it is one of the nation's most expensive crimes against property, and it occasionally brings death and serious injury as well.

Annually, fire claims nearly 12,000 lives in the

United States. Among causes of accidental death, only motor vehicle accidents and falls rank higher. The scars and terrifying memories live on with the 300,000 Americans who are injured by fire every year. Of these, nearly 50,000 lie in hospitals for a period ranging from six weeks to two years. Many of them must return over and over again for plastic and reconstructive surgery.

In spite of the staggering figures, the efforts of individuals and organizations in the arson detection field have run against the twin tides of ignorance and indifference--tides which contribute subtantially to the extraordinary magnitude of the fire problem in the United States.

With the reported number of arson-related fires rising annually, the need for early detection measures has become increasingly appartent. The sooner incendiarism can be recognized at the scene, the greater chance investigators and local arson task forces have to identify and prosecute offenders.

This basic fire scene investigation guide for police and fire investigators can effectively act as the vital aid in the early detection and prosecution of incendiary fires.

WHEN THE CALL COMES IN AT THE STATION THE RESPONDING OFFICER SHOULD NOTE:

. Date and time of alarm and how it was transmitted

These facts are necessary for the police officer's report but will also be useful in the event of a full investigation.

. Identity of person discovering and reporting the fire and a description of the fire

It is important to get a complete name and address from this individual since investigators may wish to interview him at a later date. Be wary of persons who report a number of fires within a given period of time. An investigator may want to compare the description reported with the fire fighter's observations upon arrival at the scene. Discrepancies could be significant.

OBSERVE EN ROUTE TO THE FIRE:

. Weather conditions

Is it hot, cold, cloudy of clear? Are conditions in the involved structure appropriate for the weather? For instance, if it is cold outside you should expect to find the windows closed; if it is hot, the furnace should be found off.

. Natural hazards

Is there lightning, heavy snow, ice, flooding or fog? Arsonists often wait for natural conditions which

will delay the fire department's arrival at the scene.

. Wind direction and velocity

These factors will aid in determining the natural path of fire spread.

. Manmade barriers

Are there barricades, felled trees, cables or trash containers obstructing the fire department's arrival? These could be early indications of a suspicious fire.

AS YOU ARRIVE AT THE SCENE NOTE:

. Time of arrival and description of the fire

Compare what you find at the scene with the description given by the reporter on the phone. In an industrial building, if the fire has developed greatly in intensity between the time of the alarm and the arrival of the fire department it could indicate the presence of an accelerant.

. Any cars speeding from the scene

. Dress and appearance of persons fleeing the scene

. Whether windows and doors are covered

Drawing the shades or covering the windows and doors with blankets are common techniques employed by the arsonists to delay discovery of the fire.

. Fire department's means of entry

Are the doors locked or open? Is there any evidence of forcible entry before the fire? In the event of an investigation, these facts may aid in determining the identity of the fire-setter since burglars sometimes set

fire to a building to destroy evidence of the burglary.

. Color of smoke

This is often the fire fighter's and police officer's first clue to the combustibles in the fire.

TABLE 1

COLORS OF SMOKE

Combustible Material	Color of Smoke
Hay/vegetable compounds	White
Phosphorous	White
Benzine	White to gray
Nitro-cellulose	Yellow to brownish-yellow
Sulphur	Yellow to brownish-yellow
Sulphuric acid, Nitric Acid, Hydrochloric Acid	Yellow to brownish-yellow
Gunpowder	Yellow to brownish-yellow
Clorine gas	Greenish-yellow
Wood	Gray to brown
Paper	Gray to brown
Cloth	Gray to brown
Iodine	Violet
Cooking oil	Brown
Naphtha	Brown to black
Lacquer thinner	Brownish black
Turpentine	Black to brown
Acetone	Black
Kerosene	Black
Gasoline	Black
Lubricating oil	Black
Rubber	Black
Tar	Black
Coal	Black
Foamed palstics	Black

Source: Barker & Herbert Analytical Laboratories, New Haven, Indiana

. Color of flame

Flame colors can be divided into various temperature

ranges providing another clue for the officer to determine the intensity of the fire.

TABLE 2

APPROXIMATE TEMPERATURE OF FIRE
RELATING TO THE COLOR OF THE FLAME

Flame Color	Temperature	
Faint red	900°F	480°C
Red - visable in daylight	975	525
Blood red	1050	565
Dark cherry red	1175	635
Medium cherry red	1250	675
Cherry red	1365	740
Bright red	1550	845
Salmon red	1650	900
Orange	1725	940
Lemon	1825	995
Light yellow	1975	1080
White	2200	1205
Blue white	2550	1440

Source: Robert E. Carter, Arson Investigation. (Encino, CA: Glenco Punblishing Co., Inc, 1978), 78.

. Separate and seemingly unconnected fires

. Unusual odors

Some odors are likely to be familiar to officers. These include gasoline, kerosene, paint thinner, lacquers, turpentine, Linseed oil, furniture polish, rubber insulation, natural gas and manufactured gas.

. Reaction of fire to water

A straight stream of water applied where flammable liquids were used will cause the liquid to float to the top, reignite, continue to burn and spread the fire. The

presence of an accelerant may also be suggested by flashback and several rekindles in the same area, or by an increase in burning after water is applied.

. Intensity of heat generated by fire

A very intense heat may indicate that an accelerant was applied to increase fire spread.

. Speed of fire spread

Taking into consideration the building's structure and occupancy, is the fire spread unusually fast? An unusually rapid fire spread could indicate the use of an accelerant.

WHEN THE FIRE IS EXTINGUISHED:

. Note attitude and dress of owner/occupants

One would expect to find the owner or occupants of a building distressed at an unexpected fire. Occupants should also be found in attire appropriate to the time of day, that is, if the fire occurs at 4 a.m. it would be noticeably suspicious to find all the occupants fully dressed.

. Obstacles to hinder fire fighters

Has furniture been moved in the premises making movement difficult during firefighting?

. Streamers or trailers to cause fire spread

. Artificial conditions created to assist fire spread

Arsonists often prop open fire doors, pull down plaster to expose wood, or punch holes in ceilings from

floor-to-floor or walls from room-to-room in order to increase the rate of fire spread.

. Absence of clothing, furniture, appliances, personal effects or family pets in dwelling fires

. Absence of stock, fixtures, machinery, display cases, records or raw materials in industrial or commercial properties

. Uneven burning or localized heavy charring

Be aware of charring in "unusual" places like open floor space away from any likely "accidental ignition" sources. Char on the underside of doors or on the underside of any low horizontal surface can indicate that there was a flammable liquid pool.[2]

. Tampering or damage to fire prevention facilities

Is the sprinkler system in operating condition? Were the sprinkler valves open before the fire? Was the fire alarm in working order?

. Tampering or damage to burglar alarm

. Note individuals who attend several fires

Most persons at a fire scene are intent on watching the fire's extinguishment. Persons at the scene constantly talking, laughing, or in any way making light of the situation should be considered suspisious. In addition, the "eager beaver" who runs to the fire department's aid with too much enthusiasm or too much information, should likewise be considered suspicious.

FOLLOW THESE STEPS TO DETERMINE THE AREA OF ORIGIN:

. Locate the area of origin

In general, the area of origin is located by identifying the materials involved, finding their ignition temperatures and approximate burning time and locating any draft conditions within the area of origin which may have influenced the fire spread.

. Begin in the area of least damage

. Determine whether the fire originated at the building's exterior

Look for burned or smoked areas on the roof, doors and windows. Check for any openings that may have caused drafts to influence the fire spread. If gas might be the cause, examine the outside gas valve to see if it was on or off before the fire.

. Examine the interior completely to locate the area/room of most severe damage

. Check the ceiling to find the worst area of damage

Very often the area of origin can be found directly beneath the worst point of damage on the ceiling.

. Find the lowest point of burning within the area of origin

It may be helpful to look under furnishings and shelves for severe charring. Examining the depth of char on wood can help to determine both the length of burning and the area of origin.

. Look for the direction of heat flow

After locating the area of lowest and deepest charring look for other heat indicators. Light bulbs may swell and loose their shape at 900 degrees F (480°C) when exposed to heat for ten minutes or more and the side of the bulb exposed to the fire initially may melt and come to a point (see Table 3). Heat colors will be found on chromium and other shiny metals subjected to the fire (check surfaces of ovens, toasters, irons and other appliances). The progress of the fire can be traced by comparing the color indicator temperatures on various shiny metals at different locations within the area of origin (see Table 4 and 5). Lighter, higher temperature colors may not be present after cooling but will be indicated by circles of darker colors still to be found on the metal.

Temperature of filaments in the globe:

40-100 Watts 4424-4676°F (2440-2580°C)

150-200 Watts 4712-4730°F (2600-2610°C)

300-500 Watts 4784-4838°F (2640-2670°C)

TABLE 3

INCANDESCENT LAMP TEMPERATURE

Wattage	Bare Bulb Temp.	
25 Watts	110°F	43°C
40 Watts	252	122
60 Watts	260	127
100 Watts	261	127
200 Watts	307	153

Table 3 -Continued

Wattage	Bare Bulb Temp.	
300 Watts	374	190
500 Watts	389	198

Note: The previous temperatures are based on mounting with base up in a 77°F (25°C) ambient. The temperatures vary, however, depending on the mounting position and the particular point on the bulb. For example: A 200 watt bulb would reach 307°F (153°C) with base up mounting; with a side up mounting the bulb could reach 493°F (256°C).

Source: Barker & Herbert Analytical Laboratories, New Haven, Indiana.

TABLE 4

TEMPERATURE OF FLAME INDICATED BY COLORS ON METAL

Heat Colors on Metals	Temperature	
Yellow	450°F	230°C
Brown to purple	550	290
Blue	600	320
Faint red	900	480
Dark cherry	1100	590
Full cherry	1400	760
Salmon	1600	870
Lemon	1800	980
White	2200	1200
Sparkling white	2400	1320

Source: Barker & Herbert Analytical Laboratories, New Haven, Indiana.

TABLE 5

MELTING POINT FOR CERTAIN METALS

Metal	Melting point	
Aluminum	1218°F	659°C
Brass	1570-1900	854-1038
Bronze	1290-1890	699-1032

Table 5-Continued

Metal	Melting Point	
Cast Iron	2000-2800	1093-1538
Chromium	3407	1875
Copper	1981	1083
Gold	1945	1063
Iron	2795	1535
Lead	625	329
Magnesium	1202	650
Nickel	2651	1455
Platinum	3216	1769
Silver	1761	961
Solder	varies	varies
Stainless Steel	2462-2822	1350-1550
Steel	2552-2882	1400-1583
Tin	449	232
Zinc	787	419

Source: Barker & Herbert Analytical Laboratories, New Haven, Indiana.

. Check further for any signs indicating distance from the area of origin

Window glass in the immediate vicinity of the fire's origin will exhibit only traces of smoke while glass farther away from the fire's area of origin will reveal heavier concentrations of smoke.

. Look for evidence of multiple fires

Are the sources of ignition independent of one another? When a room reaches approximately 600-700 °F (320-370°C) a flashover may occur making the entire room appear to burst into flames at once. Upon investigation, flashovers of highly combustible materials may lead the examiner to suspect there were two or more separate fires.[3]

. Keep in mind that flammable liquids and combustible

materials leave heavy charring and thus might not necessarily indicate the area of origin

. Look for a definite fire pattern

A normal pattern is upwards and outwards in a "V" shape.

INDICATORS OF SLOW OR FAST-BURNING FIRES:

. Overhead damage

Uniform overhead damage usually indicates a slow and smoldering fire, whereas extensive damage in one place on the ceiling indicates and intense, rapid buildup beginning below this spot.

. Fire pattern

A wide angle "V" pattern indicates a slow-burning fire. A narrow angle "V" pattern indicates a fast-burning fire.

. Crazing of glass

Large cracks and heavy smoke generally indicate slow burning while irregularly shaped cracks and slight smoke film generally indicate rapid burning.

. Alligatoring

A fast, intense fire will cause heavy alligatoring and shiny, smooth blisters on exposed wood surfaces while a long, low heat source will produce flat alligatoring.

. Line of demarcation

Examine a cross-section of a piece of wood found near the area of origin. A distinct line between charred

and uncharred portions of the wood indicates a fast, intense fire. A graduation in charring and an overall baked appearance usually indicates a long, slow fire.

. Spalling

Surface pieces of concrete, cement or brick may break off when exposed to an intense heat source.

DETERMINE THE CAUSE OF THE FIRE:

It may be easiest and most effective to locate the cause of the fire if furnishings are first returned to their original positions within the area of origin. Remember, a fire needs oxygen, a fuel supply and a heat source. Fuels include flammable liquids, combustible solids and combustible gases. Heat sources may include open flames, hot surfaces, electricity, friction, chemical reaction (spontaneous ignition) and compression of gases.

. Eliminate any natural or accidental causes

. Is there equipment in the area of origin that could have emitted a spark, overheated or backfired?

Be aware of low temperature or non-flaming heat sources like light bulbs, electric blankets, electric irons or steam pipes which, over a period of time, can ignite combustible materials they come into contact with. If electric motors are found in the area of origin check the interior of the motor windings to see if the fire was deep-seated; the wire coating at the interior would probably not burn away unless the motor was burned out. In motors

with bronze-type bearings, if the shaft is found frozen to the bearing it is a good indication that the motor burned internally. Motor burnout may also be indicated if, after extinguishment, the motor housing is too hot to touch but iron or steel of similar size in the same area is relatively cool. If the motor was running during the fire there may be bits of solder in the interior of the motor housing. Friction as a fire cause will be indicated if the area of damage to the motor belts is worst where it passes over the pulleys (in fires from outside sources belts are damaged most between pulleys). In any electrical appliance having a thermal control, sticking or fusing of the contact points would signify overheating of the device. Electric clocks found in the debris can be extremely helpful. They may aid in determining the burning time, progress of the fire and involvement of other electrical equipment in the area.

. Is there any possible source of an electrical short circuit?[4]

First check the fuse panel for tampering. Is it overloaded with improper fuses? A short circuit or dead short will burn the face of a glass fuse completely, while overloads or partial shorting will only melt the fuse band without burning the face of the plug. It is nearly impossible to tell whether a short circuit caused the fire or was a result of the fire, but there are some indicators which can be helpful in the determination. Continued

overload causing a short before the fire will exhibit beads of the conductor metal and fusing of the copper wire conductors. There will also be decomposition and carbonization of insulation on both sides of where the short occurred. Shorts caused during the heat of the fire, however, may show beading but decomposition and carbonization of insulation will be found only on the side exposed to the fire.[5]

TABLE 6

Number of Conductor	Amperes Safely Carried
No. 14	15
No. 12	20
No. 10	30

. Are smoking materials involved?

Cigarettes require good insulation in order to cause flaming combustion with an incubation or smoldering time of about one and one-half hours and up to three or four hours. Fires caused by cigarettes in furniture will be slow and smoldering leaving heavy charring on the insides of the furniture and on the floor in the immediate area. Long periods of smoldering will cause the coil springs in the furniture to collapse (1400°F, 760°C) and harden due to rapid cooling during extinguishment.

. Are there any signs of an explosion?

Gas leaks can cause explosions so check appliances

and gas furnace valves to see if they are open or closed. Look for loosened pipe fittings and piping sawed or cut in half. Take note as well of any gas appliances found in unusual locations.

. Is spontaneous combustion a possible fire cause?[6]

Since it takes a considerable mass of combustible materials to produce spontaneous heating, some remains from the internal charring may be found at the area of origin. Location is an important factor in considering the possibility of spontaneous ignition-the materials necessary are rarely found in great quantities in living rooms or bathrooms. It generally requires a great deal of time to produce the amount of heat necessary to cause spontaneous ignition.

. Combustible solids like wood, paper, and rags can be found in most buildings, but are they in a normal location?

. Check the layers of debris one by one to determine the sequence in which things burned

If gas soaked rags are found beneath drapes this could indicate a set fire. Are there any papers found in an unusual place? If so, are the papers of different types or dates? Checking the condition of burned wood can help to determine the length of time of flaming combustion.

TABLE 7

SUBSTANCES ACTIVE IN SPONTANEOUS COMBUSTION

Substance	Form
Aluminum	Shavings, filings, powder
Animal matter	Hides, skins, manure
Bronze	Shavings, filings
Magnesium	Shavings, filings
Miscellaneous	Sawdust, coal, flour
Steel	Shavings, filings
Vegetable matter	Hay, grain
Vegetable oils	All
Zinc	Shavings, filings

Source: Barker & Herbert Analytical Laboratories, New Haven, Indiana

. Look for specific evidence of incendiary origin

. Trailers

Trailers between fires made of string or cord soaked in oil, rope soaked in kerosene, dynamite fuses, black gunpowder, cotton batting and kapok, streamers, excelsior, or any combination of these.

. Candles used to ignite plants and trailers

Are there residues of candle wax or paraffin near the area of origin?

. Matches tied around comustible fibers or attatched to mechanical devices

. Common chemicals-like permanganate of potash, phosphorus, metallic sodium and glycerine

. Accelerant containers and evidence of flammable or combustible liquids- including gasoline, kerosene, solvents,

alcohol, acetone, paint thinner, carbon disulfide and ether

Since flammable liquids always flow to the lowest level, more severe burning found on the floor than on the ceiling may indicate the use of an accelerant as floor temperatures are usually lower than the ceiling temperatures. If an accelerant has been used charring will also be as great or greater on the bottom of furniture, shelves, etc. as on the topsides of these items. If flammable liquids have soaked into wooden flooring there may be heavy burning at the joints and ink blob outlines may be found after extinguishment. Since most floors are not completely level, look for heavy charring in corners. Odors may be found in the soil under buildings without basements if an accelerant has been used, and, if the building was wet before the fire started, concrete, brick and plaster will all retain vapors after extinguishment.

. **Rags, clothing or curtains soaked in oil**

. **Waste and paper**

. **Timing devices-including clock radios, timers and telephones**

. **Electrical equipment and appliances**-which could have initiated the fire as plants, or due to a malfuntion caused by tampering. Pressing irons left on to ignite a plant are a common source of ignition.

After establishing the fire's area of origin and cause, it is the police officer's responsibility to decide

whether the overall circumstances of the fire are suspicious enough to call for an investigation. If so, call a specialist immediately.

HANDLE ALL EVIDENCE WITH CARE:

. **If possible, photograph the fire scene extensively,** emphasizing the area of origin and any incendiary devices on the premises, making sure to photograph devices exactly where they are found.[7]

. **Record the fire scene by making a sketch**[8]

The scene should be sketched as near to scale as possible. Locality sketches ought to include the scene of the fire and any neighboring buildings. Detail sketches should show the scene as well, with particular emphasis on any plants found on the premises.

. **Leave all evidence intact if at all possible**

Tire tracks or footprints can be protected by placing boxes over them to prevent dust accumulation. Barricades would also be helpful in blocking off the area to further traffic. Areas surrounding plants should be roped off and a guard should be posted to protect the evidence.

. **If evidence must be moved be sure to take the proper precautions**

Unused, unlacquered paint cans with lids that automatically seal when closed are the best containers for transporting evidence. Glass mason jars sealed with either sealing wax or sturdy tape are also good for transporting

smaller quantities of materials. Plastic containers and plastic bags should be avoided as any evidence of petroleum products may deteriorate the plastic. Paper bags can be used for dry clothing or metal articles, matches or papers. Either a cellulose sponge or cotton batting (tampons work really well) can be used to soak up small quantities of liquids. Partially burned paper and ash are best protected by placing them between layers of glass (assuming small sheets or panes of glass are available at the scene).

. All evidence should be tagged

Labels on evidence being transported to the laboratory should include the date, time, location, discoverer's name and witnesses' names.

. Police officer should retain a record of each person who handles the evidence

. Preserve the chain of custody in handling evidence

If the chain of custody is not preserved a court may rule that the evidence is inadmissible.

. When submitting evidence to the laboratory tell then what type of examination you would like and what you want them to look for[9]

TO SECURE THE FIRE SCENE UNTIL THE INVESTIGATOR ARRIVES:

. Keep unauthorized persons off the scene

Generally a police officer can control the scene until an investigator arrives, but the officer should be

aware of the specific laws in this state in regard to keeping the property owner off the premises.

. Post a guard on the premises with specific directions

The guard should permit entrance only to persons with authorization, making sure to keep a log of all entrants. He should allow nothing to be removed by persons not directly involved in the investigation. Any unusual events should be reported to a superior officer immediately.

When the police officer's job is completed he should take notes as soon as possible, in chronilogical order, concerning all events relating to the fire. These notes will be an invaluable record both for the arson investigator and for the police officer's own courtroom appearance as a witness.[10,11]

GLOSSARY

Accelerant: A substance, usually a flammable liquid, that is used to increase the spread of fire.

Alarm System: Any device or series of devices which produce a warning signal to indicate a dangerous condition.

Alligatoring: Char patterns formed on burned wood.

Angle of the "V": The increasing distance between the apparent outside edges of fire damage as measured in progression away from the area of fire origin.

Area of origin: The room or general area in which a fire starts; classified according to its use and occupancy or process.

Arson: The deliberate act of burning or attempting to burn property or things for malacious or illegal purposes.

Backdraft: An explosion or rapid burning of heated gases resulting from the introduction of oxygen. This occurs when air is admitted to a building heavily charged by smoke from a fire shich has depleated the oxygen content of a building.

Char: The remains of burned materials; carbonization by the act of burning; generally apllied to wood. (Charred, Charring)

Char depth: The total depth of the carbonized portion of the material; measured from the original surface through the carbonized portion to the unburned substance that remains.

Combustible: A material that will ignite and burn when sufficient heat is applied.

Combustible Liquid: A liquid having a flash point at or above 100°F.

Combustion: An act or instance of burning; a chemical

process (as an oxidation) accompanied by the evolution of light and heat.

Craze: To develop a mesh of fine cracks.

Crazed glass: The cracking of glass into small segments in a very irregular pattern as a result of heating.

Debris: All that is left after a fire including the ashes, charred materials, and other damaged items.

Device: A piece of equipment or a mechanism designed and used to start a fire.

Equipment of ignition: The device which, by its malfunction or normal oeration, provided the heat necessary to cause a fire to occur.

Explosion indicator(s): Signs or indications of a rapid buildup of pressure and its subsequent violent release, such as doors pushed of hinges, glass scattered away from window frames, and similar indications. (Fire fighting actions shouldbe verified as this can produce similar indicators, particularly during straight or master stream use and overhaul activities.)

Extinguish: To cause to cease burning.

Extinguishment: The act(s) which stops the destruction by fire.

Fire: Rapid oxidation usually with the evolution of heat and light.

Fire behavior: The manner in which fuel ignites, flame develops, and fire spreads. Sometimes used in reference to the characteristics of a particular fire as distinguished from normal fire characteristics.

Firebox: A chamber (as of a furnace or steam boiler) that contains a fire; a box containing an apparatus for transmitting an alarm to a fire station.

Fire damage: The marring of anything by fire or its effects.

Fire door: A tested, listed or approved door and door enclosure constructed for the purpose of preventing the spread of fire through a standard fire wall, partition, vertical or horizontal opening.

Fire intensity: The relative amount of heat concentration and release, i.e., the hotter a fire, the more intense the fire.

Flamespread: The rate at which flames spread over surface of various materials such as guilding finishes, fabrics, etc.

Flammable: A combustible material that ignites easily, burns intensely, or has a rapid rate of flame spread. (Same as inflammable.)

Flammable liquid: A liquid having a flash point below 100°F.

Flashover: The stage of a fire when a room or other area becomes heated to the point when flames flash over the entire surface area.

Flash point: The lowest temperature at which vapors above a volatile combustible substance ignite in air when exposed to flame.

Form of heat ignition: This identifies the fuel or nature of the heat source which causes the fire.

Fully involved: The entire area of a fire building so involved with heat, smoke and flame, that immediate access to the interior is not possible until some measure of control has been obtained with hose streams.

Heat indicators: Those items in a fire area which will indicate the possible quantity of heat at that point. Some factors to consider in determining the heat present in a fire are: materials or objects which have started to deform as a result of the heat; the melting points of various materials; the ignition temperatures, and flash points of materials; and devices which have ceased to function because of the fusing of components.

Heat source: Anything which produces heat in sufficient quantity to cause ignition of the surrounding materials

Heat transfer: The transfer of heat by convection, conduction, and/or radiation.

Incendiarism: Incendiary action or behavior.

Incendiary: Relating to or involving a deliberate burning of property; i.e., a person igniting combustible materials spontaneously.

Incendiary device: An object used to set a fire, i.e., a molotov cocktail, a time fire setting system, etc.

Incendiary fire: A fire believed to have been deliberately set.

Molotov cocktail: A breakable container filled with a flammable liquid. It may be ignited either by a wick or a variety of other means and is generally thrown.

Nonflammable: Material which will not burn under most conditions.

Occupant: The person who lives in, uses or otherwise has possession of a premise.

Overhaul: A term used to cover or describe the operation of looking for a hidden flame or spark that may re-kindle the fire.

Protected area: The clean or unburned areea left by stock furniture, contents, etc., covering shelves, floors or other combustible fuels.

Pyromania: The uncontrollable impulse to start fires.

Salvage: Procedures to reduce incidental losses from smoke, water, and weather during and following fires or property saved from destruction.

Source of ignition: The equipment or form of heat which causes ignition.

Spall: Explosive breaking off of pieces of concrete or brick during exposure to the fire.

Suspicious: A term used to identify conditions found during the investigation of a fire incident. Used to indicate that the fire's cause has not ben determined and that conditions present indicate that the fire cause is suspect of the act of intentional burning. All accidental fire causes have been eliminated.

Syrupy: A description of a condition caused by the heavy, dark, sticky residue deposited by smoke.

Torch: A professional fire setter.

Trailers: Long, fuse-like trails of combustible materials deliberately used to spread fire through a structure.

"V" pattern: A description of the up and out burning pattern of fire as it travels away from the area of origin.

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