



FEMA

R0206

Dear National Fire Academy Student:

Congratulations on your acceptance into the U.S. Fire Administration's National Fire Academy's *Fire/Arson Origin-and-Cause Investigations* (FAOCI) course. Your assistance is requested in preparation for this educational opportunity.

If possible, **you should bring a copy of any official report forms used in your daily routine of fire investigations.** These include: consent to search, for residential and commercial; fire report forms; vehicle fires; fire death reporting forms; photography log; evidence log, diagram or sketch forms; and any other forms you may use. These report forms will be compiled and used in class, and reviewed by other investigators who are participating in the course.

Portions of this course are devoted to outside activities, which will be conducted at the Fire/Arson Burn facility on campus. This outside activity will be conducted regardless of weather conditions. **The actual investigation and reconstruction portions are physically demanding.** Therefore, you are required to bring:

- 1) Appropriate jacket or coat (for cold/winter weather) or attire suitable for seasonal climate.
- 2) Work gloves, BDUs, coveralls (Tyvek acceptable); air purifying respirator (if desired) – dust masks will be provided.
- 3) Work shoes or boots for use in the Burn facilities (not firefighter boots/gear).

In order to cover the amount of material required for this course, completion of work assignments and studying after classroom hours will be necessary. Also, evening classes may be conducted to complete all course requirements. A key preparatory component to this course is the pre-course reader.

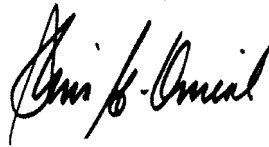
You should have already completed the following CFI Trainer modules: Fire Investigator Scene Safety; The Scientific Method for Fire/Explosion Investigations; Introduction to Evidence; Documenting the Event; Physical Evidence at the Fire Scene; Motor Vehicle Fires; Introduction to Fire Dynamics and Modeling; Investigating Fatal Fires; Search and Seizure, and Fundamentals of Residential Building Construction. Access to CFI Trainer is via Web site at www.CFITrainer.net. There are no costs or membership requirements to access these modules.

End-of-class graduation ceremonies are an important part of the course and you are expected to attend. Please do not make any travel arrangements to leave campus until after you and your classmates graduate.

Increasing numbers of students and instructors are bringing laptop computers to campus. You alone are responsible for the security and maintenance of your equipment. The Academy cannot provide you with computer software, hardware, or technical support to include disks, printers, scanners, etc. There are a limited number of 120 Volt AC outlets in the classrooms. A Student Computer Lab is located in Building D and is available for all students to use. It is open daily with technical support provided in the evenings. This lab uses Windows XP and Office 2010 as the software standard.

Should you need additional information related to course content or requirements, please feel free to contact Mr. Michael L. Donahue, Fire/Arson and Explosion Investigation Curriculum Training Specialist, at (301) 447-1158 or email at Michael.Donahue2@fema.dhs.gov

Sincerely,

A handwritten signature in black ink, appearing to read "Denis Onieal". The signature is written in a cursive style with a large, stylized initial "D".

Dr. Denis Onieal, Superintendent
National Fire Academy
U.S. Fire Administration

February 2013

PRECOURSE READER

Fire/Arson Origin-and-Cause Investigations: Precourse Reader

Congratulations on your acceptance into the *Fire/Arson Origin-and-Cause Investigations* course. Through your attendance, this course will allow you to use concepts and methods that face the fire investigator. The course is designed to provide the knowledge and skills necessary to

1. Develop an understanding of the scientific principles of fire dynamics.
2. Ensure a systematic approach to proper scene investigation and documentation.
3. Conduct a systematic origin and cause investigation.
4. Facilitate a thorough follow-up investigation and case presentation.

In order to enhance your learning in this course, preparation on your part is essential. As each class consists of professionals from the fire service and law enforcement communities, familiarity with the contents of this reader, coupled with the recommended readings, will enable you to participate more effectively in discussions on fire dynamics, fire chemistry, and fire terminology which is covered in Part I. Part II of the reader provides information that will be discussed in detail in the legal module during the second week of the class with emphasis on legal terminology and concepts, along with representative case law germane to the field of fire investigations.

Subjects covered in the 2-week course are broken down into the following units of instruction, but not necessarily in order of listing:

- Introduction
- Health and Safety
- Scientific Method
- Complex Scenario
- Fire Dynamics
- Flashover Cells
- Myths and Legends
- Investigative Resources
- Electrical Fire Investigation
- Origin and Cause
- Evidence Collection and Preservation
- Documenting the Scene
- Report Writing
- Fatal Fire Investigation
- Automotive/Vehicle Fires
- Legal Considerations
- Motivation, Interviewing, and Interrogation
- Practical Exercise Scene
- Conclusion/Final Exam

Significant study time will be required for this course, along with quizzes and written examinations. A minimum score of 70 is required on the mid-term and final exams for successful completion.

Due to the short period of time you will be here, and in consideration of the volume of material, it is the students' responsibility to become familiar with the overall content as some aspects of the course are not covered in extensive detail during classroom lecture.

This course is designed to meet or exceed the applicable sections of the National Fire Protection Association's (NFPA's) *Guide for Fire and Explosion Investigation*, NFPA 921; 2011 Edition.

The following reference materials are highly recommended reading prior to your attendance.

- DeHaan, John D. *Kirk's Fire Investigation*, 6th Ed., New Jersey: Brady, 2007.
- DeHaan, John D. and Icove, David. *Forensic Fire Scene Reconstruction*, 3rd Ed., Brady, 2013.
- Lentini, John J. *Scientific Protocols for Fire Investigation*, Taylor and Francis, 2006.
- NFPA 921, *Guide for Fire and Explosion Investigations*, 2011 Ed., Quincy: National Fire Protection Association.
- NFPA 1033, *Standard for Professional Qualifications for Fire Investigator*, 2009 Ed., Quincy: National Fire Protection Association.
- Quintiere, James G. *Principles of Fire Behavior*, Delmar Publishers, 1998.

If you have any questions regarding the readings or curriculum, please feel free to contact Mr. Michael L. Donahue, Fire/Arson and Explosion Investigation Curriculum Training Specialist at (301) 447-1158 or email at Michael.Donahue2@fema.dhs.gov

Part I CHEMISTRY AND PHYSICS OF FIRE

Those that are responsible for the investigation of fire scenes must have a working knowledge of the behavior of fire since they often are required to interpret the aftermath of a fire, and frequently are required to use both technical and/or general explanations of fire behavior in legal proceedings.

A knowledgeable understanding of the behavior of fire helps to demonstrate the investigator's credibility in the area of fire cause determination. This understanding, coupled with the ability to explain the behavior of fire, will add credibility to court testimony and to the investigator's opinion into the origin and cause of the fire.

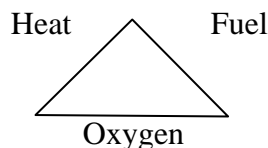
One of the more popular tactics used by arson defense attorneys is to attack the investigator's credibility with regard to fire behavior. Therefore, a solid, basic understanding of the behavior of fire is the foundation from which any fire cause investigation will be developed and through which the investigator's credibility as an expert witness will be determined.

Fire is a complex chemical process, and fire investigators must understand the basic chemistry and physics involved, which will enable them to formulate their opinions based on these sound scientific principles. If the investigator is not able to explain the technical aspects of fire behavior, he/she will have a tough time qualifying as an expert witness. The opposing attorneys easily can use questions about the chemistry and physics of fire to discredit a fire investigator effectively.

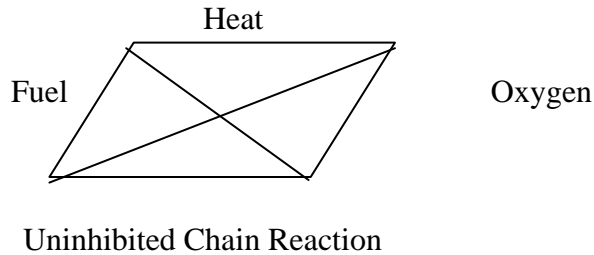
Fire, or better, the **diffusion flame process**, consists of three basic elements: fuel, oxygen, and heat. These basic components have been recognized in the science of fire protection for over 100 years. The diffusion flame process is defined as "a rapid self-sustaining oxidation process accompanied by the evolution of heat and light of varying intensities."

Six elements are needed in the life cycle of fire: input heat, fuel, oxygen, proportioning, mixing and ignition continuity. All of these elements are essential for both the initiation and continuation of the diffusion flame process. The first three elements, heat, fuel, and oxygen are represented by the fire triangle. Reference diagram:

Fire Triangle



The combustion reaction can be depicted more accurately by a four-sided solid geometric form called a tetrahedron. The four sides represent heat, fuel, oxygen, and uninhibited chain reactions.



Input Heat

Solid or liquid materials do not burn. For combustion to take place, these materials must be heated sufficiently to produce vapors. It is these vapors which actually burn. The lowest temperature at which a solid or liquid material produces sufficient vapors to burn under laboratory conditions is known as the **flashpoint**. A few degrees above the flashpoint is the **flame point**, the temperature at which the fuel will continue to produce sufficient vapors to sustain a continuous flame. The temperature at which the vapors will ignite is the **ignition temperature**, sometimes referred to as the auto ignition temperature. If the source of the heat is an open flame or spark, it is referred to as **piloted ignition**.

For example, gasoline has a flashpoint of -45°F (-42.8°C) and an ignition temperature of 536°F (280°C). This means that at any temperature at or above -45°F (-42.8°C), the gasoline will be producing sufficient vapors to be ignited if exposed to an open flame, spark, or any heat source of 536°F (280°C) or greater.

Fuel

Initially the fuel may be in the form of a gas, liquid, or solid at the ambient temperature. As discussed previously, liquid and solid fuels must be heated sufficiently to produce vapors.

In general terms, **combustible** means capable of burning, generally in air under normal conditions of ambient temperature and pressure, while **flammable** is defined as capable of burning with a flame. This should not be confused with the terms flammable and combustible liquids.

Flammable liquids are those which have a flashpoint below 100°F (37.8°C), such as gasoline, acetone, and ethyl alcohol. **Combustible liquids** are those which have a flashpoint at or above 100°F (37.8°C), such as kerosene and fuel oil.

The **specific gravity** of a liquid is the ratio of the weight of the substance to that of water, which is assigned a value of 1. A substance with a specific gravity greater than 1 will tend to sink, while one whose specific gravity is less than 1 will tend to float.

Oxygen

The primary source of oxygen normally is the atmosphere, which contains approximately 20.8 percent oxygen. A concentration of at least 15 to 16 percent is needed for the continuation of flaming combustion, while charring or smoldering (**pyrolysis**) can occur with as little as 8 percent. Pyrolysis is defined as the transformation of a compound into one or more other substances by heat alone. While the atmosphere is usually the primary source of oxygen, certain chemicals, called "oxidizers" can be either the primary or secondary source. Examples are chlorine and ammonium nitrate.

Mixing and Proportioning

Mixing and proportioning are reactions which must be continuous in order for fire to continue to propagate. The fuel vapors and oxygen must be mixed in the correct proportions. Such mixture of fuel vapors and oxygen is said to be within the **explosive limits** or **flammable limits**. Explosive or flammable limits are expressed in the concentration (percentage) of fuel vapors in air. A mixture which contains fuel vapors in an amount less than necessary for ignition to occur is too lean, while a mixture which has too high a concentration of fuel vapors is too rich.

For example, the explosive or flammable limits for propane are 2.15 to 9.6. This means that any mixture of propane and air between 2.15 percent and 9.6 percent will ignite if exposed to an open flame, spark, or other heat source equal to or greater than its ignition temperature, which is between 920°F (493.3°C) and 1,120°F (604.4°C).

Another important characteristic of gases is **vapor density**--the weight of a volume of a given gas to an equal volume of dry air, where air is given a value of 1.0. A vapor density of less than 1.0 means that the gas is lighter than air and will tend to rise in a relatively calm atmosphere, while a vapor density of more than 1.0 means that the gas is heavier than air and will tend to sink to ground/floor level.

Ignition Continuity

Ignition continuity is the thermal feedback from the fire to the fuel. Heat is transferred by conduction, convection, radiation, and direct flame contact.

- **Conduction** is the transfer of heat by direct contact.
- **Convection** is the transfer of heat caused by changes in density of liquids and gases. It is the most common method of heat transfer; when liquids or gases are heated they become less dense and will expand and rise.
- **Radiation** is the transfer of heat by infrared radiation (heat waves, e.g., the sun) which generally is not visible to the naked eye.

- **Direct flame contact** is a combination of two of the basic methods of heat transfer. As hot gases from the flame rise into contact with additional fuel, the heat is transferred to the fuel by convection and radiation until the additional fuel begins to vaporize and it is the vapors that will be ignited by the flames.

The amount of heat generated is measured in **British thermal units** or **Btu's**. One Btu is the amount of heat required to raise the temperature of 1 pound of water 1°F.

Fires are classified by the types of materials that are burning. **Class A fires** involve ordinary combustible materials such as wood, cloth, paper, rubber, and many plastics. **Class B fires** involve flammable/combustible liquids, greases, and gases. **Class C fires** involve energized electrical equipment. **Class D fires** involve combustible metals such as magnesium, titanium, zirconium, sodium, and potassium.

All fires produce **combustion products**. Combustion products fall into four categories: heat, gases, flame, and smoke. **Heat** is defined as a form of energy characterized by vibration of molecules and capable of initiating and supporting chemical changes and changes of state. **Gases** are substances that have no shape or volume of their own and will expand to take the shape and volume of the space they occupy. Fire gases include carbon monoxide, hydrogen cyanide, ammonia, hydrogen chloride, and acrolein. **Flame** is the luminous portion of burning gases or vapors. **Smoke** is the airborne particulate products of incomplete combustion, suspended in gases, vapors, or solid or liquid aerosols. Soot, black particles of carbon, is contained in smoke.

A fire in a **room** or a **defined space** generally will progress through three predictable developmental stages. The behavior of a fire in a **corridor** is affected by the same conditions as a room or defined space fire. The physical configuration of a corridor can cause the fire to spread rapidly, since the corridor will function as a horizontal chimney or flue. Rapid fire spread in a corridor can occur with normal materials providing the fuel load. In order to determine the origin and cause of a fire, the investigator must be able to interpret the effects of the three stages of fire development during the examination of the fire scene.

The first stage of fire development is the **incipient stage** (growth). This begins at the moment of ignition, and at this time the flames are localized. At this stage the fire is **fuel regulated**. That is, the fire propagation is regulated not by the available oxygen but by the configuration, mass, and geometry of the fuel itself. The oxygen content is within the normal range and normal ambient temperatures still exist. A plume of hot fire gases will begin to rise to the upper portions of the room. As convection causes the plume to rise it will draw additional oxygen into the bottom of the flames. Fire gases such as sulfur dioxide, carbon monoxide, and others will begin to accumulate in the room. If there is any solid fuel above the flame, both convection and direct flame contact will cause upward and outward fire spread, producing the characteristic "V" pattern charring.

Second is the **free-burning stage** (development). In this stage more fuel is being consumed, and the fire is intensifying. Flames have spread upward and outward from the initial point of origin by convection, conduction, and direct flame impingement.

A hot, dense layer of smoke and fire gases is collecting at the upper levels of the room and is beginning to radiate heat downward. This upper layer of smoke and fire gases contains not only soot but also toxic gases such as carbon monoxide, hydrogen cyanide, hydrogen chloride, arcolein, and others. Unless the room of origin is sealed tightly, the smoke and fire gases will be spread throughout the building. The temperature at the ceiling level has begun to rise rapidly while the floor temperature is still relatively cool. It is still possible to survive in the room at the cooler lower level.

The fire continues to grow in intensity and the layer of soot and fire gases drops lower and lower. The soot and combustible gases continue to accumulate until one (or more) of the fuels reaches its ignition temperature. **Rollover** occurs when ignition of the upper layer results in fire extending across the room at the ceiling level. This rollover causes the ceiling temperature to increase at an even greater rate and also increases the heat being radiated downward into the room. Secondary fires can and do result from the heat being generated. The fire is still fuel regulated at this time.

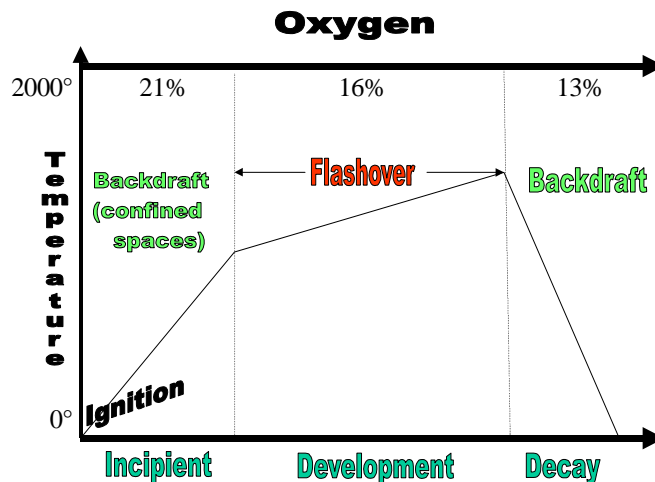
When the upper layer reaches a temperature of approximately 1,100°F (593.3°C), sufficient heat is generated to cause simultaneous ignition of all fuels in the room. This is called **flashover**. Once flashover has occurred, survival for more than a few seconds is impossible. Temperatures in the space will reach 2,000°F (1,093.3°C) or more at the ceiling level down to over 1,000°F (538.8°C) at the floor. At the point of flashover the fire is still fuel regulated; however, if the fire stays confined to the room of origin it quickly becomes oxygen regulated. The rapid temperature rise associated with flashover generally results in windows breaking, which then produces an unlimited supply of oxygen causing the fire to transfer back to the fuel regulated phase. As a general rule, once flashover has occurred full involvement of the structure quickly follows.

Flashover results in intense burning of the entire room and its contents. Flashover will produce heavy floor-level burning and even can result in burning on the underside of objects in the room.

The length of time necessary for a fire to go from the incipient stage to flashover depends upon the fuel package, the room geometry, and ventilation. In the typical residential accidental fire setting, this time may be as quick as 2 to 3 minutes.

Eventually the fuel is consumed and open burning becomes less and less prevalent. If the fire has been contained to a room or space, and the oxygen level drops below 15 to 16 percent, open flaming combustion will stop even if unburned fuel still is present. At this point, glowing combustion will take place; this is known as the **smoldering stage** (decay). High temperature and considerable quantities of soot and combustible fire gases have accumulated, and the fire is oxygen regulated. The temperatures may exceed the ignition temperatures of the accumulated gases. If a source of oxygen is introduced in the area, the accumulated soot and fire gases may ignite with explosive force. This smoke explosion is known as a **backdraft**. The pressures generated by a backdraft are enough to cause significant structural damage and endanger the lives of firefighting personnel and bystanders. Backdrafts can take place in any enclosed space; they are not limited to rooms. Attics, basements, and concealed ceiling spaces also are susceptible. There also is a danger of backdraft during overhaul.

Developmental Stages of Fire



An essential component to understanding the thermodynamics of fire is also understanding building construction and how fires progress through occupancies. There are five types of buildings. **Type I--Fire-Resistive** is where the structural elements of the building are always steel, iron, concrete, or masonry. Walls and permanent partitions shall be of noncombustible fire-resistive construction except that permanent nonbearing partitions may have fire-retardant treated wood. **Type II--Non-Combustible/Fire-Resistive** construction in which the walls, partitions, and structural members are of noncombustible materials, but do not qualify as a Type I building. These buildings also have at least a 1-hour or a no-hour construction feature. **Type III--Ordinary Construction** in which exterior bearing walls or bearing partitions of exterior walls are of noncombustible materials and have a minimum hourly fire-resistive rating. Wood is allowed for interior use only. **Type IV--Heavy Timber Construction** where exterior bearing and nonbearing walls are noncombustible and have a minimum fire-resistive rating of 4 hours. Columns, beams, and girders are commonly heavy timber with wood floors and roof construction built without concealed spaces. **Type V--Wood-Frame Construction** in which exterior walls, bearing walls, partitions, floors, and roofs, as well as their supports, are wholly or partly wood or other combustibles.

Structural loads and loading is another concept that has an outcome in the fire investigation field. There are four types of loads: **Dead Load** is the weight of the building and any equipment permanently attached or built-in. **Live Load** is any load other than dead load. Live loads vary with intended usage. Examples are occupants, storage, furnishings not permanently attached or built-in. Fire operations increase the live loads both in water accumulation and in fire personnel. **Impact Loads** are delivered in a short period of time. They can be more harmful when supported as dead or live loads. Examples of common impact loads are explosions, wind, and earthquakes.

Fire Loads are the total number of British Thermal Units (Btu's) which might be evolved during a fire in the building or area under consideration and the rate at which the heat will be evolved. Occupancy type has a direct relationship to fire load and generally dictates the possible fire load.

The fire investigator also needs to consider building elements into the fire scene investigation. These include

- Walls and partitions
 - Rating of fire walls
 - Wall finish and certifications
 - Wall integrity
- Ceiling assemblies
 - Concealed spaces acting as flues
 - Ceiling integrity
- Floor assemblies
 - Floor coverings
 - Floor integrity
 - Concealed spaces acting as flues
- Attic and roof assemblies
 - Usually susceptible to fire spread
 - Often constructed of unprotected materials
 - Storage of combustibles
 - Attic areas (unprotected concealed spaces) should not exceed 3,000 square feet without fire walls.

Part II LEGAL CONSIDERATIONS

Arson Common Law

The body of law which was brought over from England when the American colonies began to adhere to the laws of England. At common law, arson was the "willful and malicious burning of the dwelling house of another." "Dwelling house" also included structures appurtenant thereto. Generally, the common law required that the house be "inhabited" before the crime could be committed. This did not, however, require the house to be occupied by someone before arson could occur; it meant the house must not be abandoned.

Statutory Law

Laws codified by State legislatures regarding the elements of a crime. Illinois (720 ILCS 5/20-1) defines arson as knowingly damaging "any real property, or any personal property having a value of \$150 or more, of another without his consent." Texas (Chapter 28.02) defines arson as "starting a fire or causing an explosion with intent to destroy or damage any building, habitation, or vehicle."

Case Law

Judicial interpretation of the statutory law as provided by the Congress or State legislatures. Case law may occur where statutory law does not. The Exclusionary Rule of the Fourth Amendment is a judicial creation. The Exclusionary Rule of the Fifth Amendment is a judicial creation. If the Congress or legislature does not approve of the judicial decision rendered, it can pass new legislation. This is a brief example of the "checks and balances" provided by the Constitution.

Other crimes/laws related to fires, burning

Definition of arson varies. Some statutes define arson as occurring only when a building or inhabitable structure is damaged by fire.

Elements of the offense of arson (*corpus delicti--body of the crime*).

- Must have a burning with damage to property.
- Must have a criminal intent.
- Motive is not an element of the offense; although it may be helpful in explaining what happened.
- Conduct of the accused in starting, conspiring to start, aiding and abetting, or otherwise being involved in the fire.
- Must prove the fire was not a result of accidental causes.
- Prove incendiary origin (to show "willful and malicious" element of the offense).

Burdens of proof.

Criminal--"Proof beyond a reasonable doubt."

Civil--"Preponderance of the evidence."

Obligations for prosecution.

Prosecution must disclose, generally, all evidence in its possession that may benefit the defendant ("evidence favorable to the accused").

Fourth Amendment Elements

"The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no Warrants shall issue, but upon probable cause, supported by Oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized." (U.S. Constitution, Amendment IV.)

The Fourth Amendment applies to the States through the Due Process Clause of the Fourteenth Amendment. *Mapp v. Ohio*, 367 U.S. 643 (1961). "No warrant shall issue, but upon probable cause." "Probable cause is a flexible, common-sense standard. It merely requires that the facts available to the officer would warrant a man of reasonable caution in the belief that certain items may be contraband or stolen property or useful as evidence of a crime. A practical, nontechnical probability that incriminating evidence is involved is all that is required." *Texas v. Brown*, 460 U.S. 730, 742 (1983). "Right of the people to be secure against unreasonable searches and seizures."

Searches without a warrant violate the Fourth Amendment unless exigent circumstances exist. Before agents of the government may invade the sanctity of the home, the burden is on the government to demonstrate exigent circumstances that overcome the presumption of unreasonableness that attaches to all warrantless home entries. *Welsh v. Wisconsin*, 466 U.S. 740, 750 (1984). Exigent circumstances which the courts have found relieve the government from obtaining a search warrant:

- Fighting a fire.
 - *Michigan v. Clifford*, 464 U.S. 287, 294 (1984).
 - *Michigan v. Tyler*, 436 U.S. 499 (1978).
- To prevent imminent danger to police officers or others.
- Imminent destruction or concealment of evidence. *United States v. Santana*, 96 S. Ct. 2406 (1976).
- "Hot pursuit" of a fleeing felon.
- Sound of gunfire. *People v. Davis*, 473 NW2d 748 (Mich. CT. App. 1991).
- View from outside of victim lying on the floor, bleeding profusely, and defendant stabbing him. *People v. Rivera*, 566 NYS2d 397 (App. Div. 1991).
- Protection of 4-year old and 2-week old children left alone for hours. *State v. Plant*, 461 NW2d 253 (Neb. 1990).

- Certain odors--Smell of ether, and defendant running from house when police arrived. *United States v. Wilson*, 875 F.2d 215 (9th Cir., 1989).
- Smell of methamphetamine and sound of flushing. *State v. Heikkinen* 765 P.2d 1252 (Or. Ct. App. 1988).
- Smell of decomposing body. *State v. York*, 464 NW2d 36 (Wis. Ct. App. 1990).

Plain View.

- Elements of the Plain View Doctrine are found in *Coolidge v. New Hampshire*, 403 U.S. 443 (1971).
- Plain view alone never is enough to justify the warrantless seizure of evidence. There must be a prior valid intrusion.
- Search must be pursuant to a warrant to search in a given area for specified objects; in the course of the search come across some other article of incriminating character.

Administrative searches.

Searches to further a regulatory scheme when the Federal regulatory presence is sufficiently comprehensive and defined that the owner surely must be aware that property will be subject to periodic inspection. Administrative warrant is constitutional if it is issued pursuant to a neutral plan based on specific criteria, and if the warrant application clearly and adequately explains how an inspection of the particular company falls within the plan. *Donovan v. Trinity Industries, Inc.*, 824 F.2d 634, 635 (8th Cir., 1989).

If the primary object is to determine the cause and origin of a recent fire, an administrative warrant will suffice. The fire officials must show that a fire of undetermined origin has occurred on the premises. The scope of the proposed search is reasonable and will not intrude unnecessarily on fire victim's privacy. Search will be executed at a reasonable and convenient time. *Michigan v. Clifford*, 464 U.S. 287, 294 (1984).

Fourth Amendment as Applied to Fire Scenes

Clearly, an exigent circumstance exists allowing firefighters to enter private property to fight a fire. Firefighters may remain to determine the origin and cause of the fire. *Michigan v. Clifford*, 464 U.S. 287, 294 (1984) and *Michigan v. Tyler*, 436 U.S. 499 (1978).

Postfire searches are admissible when conducted within a reasonable time. The evidence was in plain view when seized. *Michigan v. Tyler*, 436 U.S. 499 (1978). Additional entries, however, after a reasonable time has passed, must be made pursuant to the warrant procedures.

Failure to follow Fourth Amendment guidelines can result in evidence seized pursuant to an unconstitutional search warrant, or the unconstitutional execution of the warrant, being suppressed during the prosecution's case-in-chief if the law enforcement officer did not have an objectively reasonable belief in the warrant's constitutionality.

Case law evolution of Exclusionary Rule.

- *Mapp v. Ohio*, 367 U.S. 643 (1961).
- In *Nardone v. United States*, 308 U.S. 338, 341 (1939), Justice Frankfurter indicated that an illegal search and seizure of a person's diary together with the information obtained from the diary must be suppressed as "fruit of the poisonous tree."
- See *Wong Sun v. United States*, 371 U.S. 471 (1963). If the evidence was obtained by exploitation of the illegality, or if it was obtained by means sufficiently distinguished to be purged of the primary taint, then it may come in.

The exclusionary rule applies to the fruits of unconstitutional acts performed by government employees and their agents. It does not apply to unlawful acts. It also does not apply to acts undertaken by private citizens. *United States v. Payner*, 447 U.S. 727 (1980).

Limits to *Miranda* warning as identified in the Fifth Amendment. General rule on *Miranda* warnings when suspect is in custody or there is a "custodial interrogation" in progress-- Interrogations by police officers are much more likely to be held "custodial interrogations" requiring *Miranda* warnings than interrogations by others.

Custodial interrogations are more likely not to be found when the interrogations occur at the suspect's residence, place of employment, nonpolice vehicle, residence of another, etc. Custodial interrogations are most likely to be found when the interrogations are conducted in a police vehicle, at a police station, in jail, in prison, etc.

History of Self-incrimination Clause of Fifth Amendment

Fifth Amendment protection against self-incrimination applies to the States through the Fourteenth Amendment. *Malloy v. Hogan*, 378 U.S. 1 (1964).

The privilege "**protects an accused only from being compelled to testify against himself, or otherwise provide the state with evidence of a testimonial or communicative nature.**" *Schmerber v. California*, 384 U.S. 757 (1966).

"In order to be testimonial, an accused's communication must itself, explicitly or implicitly, relate a factual assertion or disclose information. Only then is a person compelled to be a 'witness' against himself." *Doe v. United States*, 487 U.S. 201, 210 (1988).

Placing a suspect in a lineup, or asking him/her to repeat a phrase provided by police so the witness could view and listen to the voice is acceptable. *United States v. Wade*, 388 U.S. 218 (1967).

Requiring a suspect to provide a handwriting sample does not violate the Fifth Amendment because it is an identifying physical characteristic outside the privilege's protection. *Gilbert v. California*, 388 U.S. 263

Voice exemplars are acceptable when used solely to measure the physical properties of the witnesses' voices. *United States v. Dionisio*, 410 U.S. 1 (1973).

Police could compel a suspect to provide a blood sample to determine whether the suspect was intoxicated. *Schmerber v. California*.

"The court distinguished between the suspect's being compelled himself to serve as evidence and the suspect's being compelled to disclose or communicate information or facts that might serve as or lead to incriminating evidence." *Doe v. United States*, 487 U.S. at 211 n. 10.

Once the suspect asserts his/her right to speak with counsel, further questioning must stop.

Michigan v. Tyler

A. Facts:

1. Fire starts shortly before midnight January 21, 1970, at 0000.
2. Chief See arrives at scene on January 21, 1970, at 0200.
3. Chief See's responsibility: "to determine the cause and make out all reports."
 - a. Chief See is informed by Lieutenant Lawson that two plastic containers of flammable liquid were found in the building.
 - b. Chief See determines the fire "could possibly have been an arson" and calls for Detective Webb.
 - c. Chief See "looked throughout rest of building to see if there was any further evidence, to determine what the cause of the fire was."
4. Detective Webb arrives at scene at 0330.
5. Fire is extinguished and firefighters depart at 0400.
6. Webb takes several pictures but abandons efforts because of smoke and steam.
 - a. Webb takes containers to fire station for safekeeping.
 - b. Neither Webb nor See had consent or a warrant for entries, nor for the removal of the containers.
7. See returns with Assistant Chief Somerville around 0800.
 - a. Somerville's job is to determine the "origin of all fires that occur within the township."
 - b. Fire was extinguished and building empty when they arrived.
8. Webb returns around 0900.
 - a. Webb discovers suspicious "burn marks in the carpet which he could not see earlier because of heat, steam, and darkness."
 - b. Webb also discovers "pieces of tape, with burn marks, in the stairway."
 - c. Webb removes the carpet and sections of the stairs to preserve as evidence.
 - d. Somerville searches through rubble "looking for any other signs of evidence that showed how this fire was caused."
9. Sergeant Hoffman of Michigan State Police Arson Section arrived on February 16, 1970, to take photos at scene.
 - a. Hoffman checked circuit breakers.

- b. Hoffman had television repairmen examine remains of television sets found in ashes.
 - c. Hoffman's entries were without warrants or consent.
 - d. Hoffman's purpose was "of making an investigation and seizing evidence."
- B. Michigan Supreme Court holding:
 - 1. Once firefighters leave the premises, a warrant is required to reenter and search premises, unless there is consent, or premises have been abandoned.
 - 2. All evidence collected after fire was extinguished at 0400 was excluded in violation of Fourth and Fourteenth Amendments.
- C. State of Michigan's position:
 - 1. Entry to investigate cause of fire is outside protection of Fourth Amendment because no individual privacy interests are threatened.
 - a. If occupant set blaze, then his "actions show he has no expectation of privacy."
 - b. If fire has other causes, occupants are treated as victims.
 - 2. No purpose would be served by requiring warrants to investigate cause of fire.
- D. Majority opinion.
 - 1. Recognizes people still have protected privacy interests in burned property.
 - 2. Courts specifically held that it is impossible to justify warrantless search on grounds of abandonment by arson.
 - 3. Fourth Amendment applies to firefighters.
 - 4. Both administrative searches and searches for evidence of crime are encompassed by the Fourth Amendment.
 - a. Probable cause for administrative searches exists if reasonable legislative or administrative standards for conducting area inspection are satisfied.
 - b. Such searches will not depend necessarily on specific knowledge of the conditions of the particular dwelling; rather, may be based upon passage of time, nature of building, condition of entire area, etc. *Camara v. Municipal Court*, 387 U.S. 523.
 - 5. Major function of warrant is to provide property owner with sufficient information to reassure him of the entry's legality.
 - 6. If authorities are seeking evidence to be used in criminal prosecution, the usual standard of probable cause will apply.
 - 7. All entries in this case were without proper consent and were not authorized by valid search warrant--each is therefore illegal **unless** it falls within one of the carefully defined classes of cases (**exigent circumstances**).
 - 8. Burning building is exigency to render warrantless entry reasonable.
 - a. Once inside, firefighters may seize evidence of arson that is in plain view.
 - b. Supreme Court specifically rejects position that once fire ends, the justification for being on property ends.
 - 9. Officials need no warrant to remain for reasonable time to investigate cause of blaze after extinguished.
 - 10. Court finds morning reentries by Chief See, after firefighters departed at 0400, acceptable as an actual continuation of the first entry.
 - a. Court permits the evidence collected on January 22 as admissible evidence.

- b. All entries after January 22 were done without consent or valid warrant and no exigent circumstance existed to justify reentry.

Michigan v. Clifford

- A. Timeline:
 1. Fire truck arrives at Clifford house on October 18, 1980, at 0540.
 2. Fire extinguished and all fire and police depart 0704.
 3. Lieutenant Beyer told to investigate Clifford fire on October 18 at 0800.
 4. Lieutenant Beyer arrives at Clifford house on October 18 at 1300.
 - a. Beyer sees work crew on scene boarding up house.
 - b. Crew pumping 6 inches of water out of basement.
 - c. Neighbor tells Beyer he called Clifford and has been instructed to call Clifford's insurance agent to hire boarding crew to secure house.
 5. Lieutenant Beyer begins search of house at 1330, after water is pumped out.
- B. Evidence:
 1. In driveway, Lieutenant Beyer sees fuel can which firefighters found in basement. He seizes the evidence.
 2. Lieutenant Beyer begins search without a warrant or obtaining consent.
 3. Beyer's search quickly confirms that fire originated beneath basement stairway.
 4. Beyer detects strong odor of fuel throughout basement.
 5. Beyer finds two more Coleman fuel cans beneath stairway.
 6. Beyer further finds crock pot with attached wires leading to electrical timer plugged into outlet. Timer set to turn on at 0345 and to turn off at 0900. Timer had stopped somewhere between 0400 and 0430.
 7. Beyer and partner then search remainder of house going through drawers and closets. They find nails but no pictures on the walls.
- C. Clifford's position:
 1. Exclude evidence in basement and upstairs searches because the searches were to gather evidence of arson and were conducted without warrant, consent, or exigent circumstance.
 2. Search violated the Fourth and Fourteenth Amendments.
- D. State's position:
 1. Exempt from warrant requirement all administrative investigations into cause and origin of fire.
 2. Modify *Tyler* to allow warrantless searches in this case.
- E. Issue the Court decided:

Can an arson investigator, in the absence of exigent circumstances or consent, enter a private residence without a warrant to investigate the cause of a recent fire?

- F. Plurality opinion (Powell, Brennan, White, and Marshall).
1. Court declines to exempt administrative investigation into cause and origin of a fire from warrant requirement.
 2. Constitutionality of warrantless and nonconsensual entries onto fire-damaged premises turns on several factors:
 - a. Are there legitimate privacy interests in fire-damaged property that are protected by the Fourth Amendment?
 - b. Do exigent circumstances justify governmental intrusion regardless of any reasonable expectation of privacy?
 - c. Is the object of the search to determine the cause of the fire or to gather evidence of criminal activity?
 3. Legitimate privacy interests.
 - a. Objective test: whether the expectation of privacy is one that society is prepared to recognize as "reasonable" (*Katz v. United States*).
 - If yes then warrant requirement applies.
 - If no, then there is no warrant requirement.
 - b. Court found Cliffords had personal belongings which remained after the fire and that they had taken action to secure their home against intrusion.
 - c. The Cliffords retained a reasonable privacy interest in their fire-damaged residence, and postfire investigations were subject to warrant requirement.
 4. Exigency:
 - a. Court followed *Tyler* and held that a burning building creates an exigency that justifies a warrantless entry to fight the blaze.
 - b. Once in the building the fire officials need no warrant to remain for a "reasonable time to investigate the cause of a blaze after it has been extinguished." (*Tyler*.)
 - c. Determining cause and origin of fire serves a compelling public interest; warrant requirement does not apply in such cases.
 - d. Additional investigation begun after fire was extinguished and firefighters and police have left the scene generally must be made pursuant to a warrant or the identification of some new exigency.
 5. Object of the search (if warrant is necessary):
 - a. If primary objective is to determine origin and cause, an administrative warrant is sufficient. Must show:
 - Fire of undetermined origin has occurred on premises.
 - Scope of proposed search is reasonable and will not intrude unnecessarily on fire victim's privacy.
 - Search will be executed at reasonable and convenient time.
 - Evidence found in plain view may be seized in administrative search.
 - Administrative search into cause of a recent fire does not give fire officials license to roam freely through fire victim's private residence.
 - b. If primary objective is to gather evidence of criminal activity, criminal search warrant may be obtained on showing of probable cause to believe relevant evidence will be found in place to be searched.

6. Court found warrantless and nonconsensual search of basement and house would be valid only if exigent circumstances justified object and scope of each.
 - a. Beyer's search was for evidence of criminal activity as to basement and house.
 - b. Excludes all evidence except the gas can found on the driveway in plain view.
 7. Plurality distinguishes *Clifford* from *Tyler*.
 - a. Challenged search was not continuation of earlier search.
 - b. The Cliffords had taken steps to secure their privacy interests that remained in their residence.
 - c. The Cliffords' privacy interests in their residence were significantly greater than those of Tyler in the fire-damaged furniture store.
 8. Plurality holds: A subsequent postfire search must be conducted pursuant to a warrant, consent, or the identification of some new exigency.
- G. Stevens concurrence:
1. Unanimity exists, within the Court, regarding the scope of Fourth Amendment protection afforded to owner of fire-damaged building:
 - a. No one questions right of firefighters to make forceful, unannounced, nonconsensual, warrantless entry into a burning building.
 - b. Firefighters have the right to remain on premises, not only until the fire is extinguished and no danger of rekindling exists, but also to investigate the cause of the fire.
 - c. After investigators determine the cause of fire and have located the place it originated, search of other portions of premises may be conducted only pursuant to a warrant.
 2. Argues the presumption that once firefighters depart, fire has been extinguished and any danger of rekindling is slight.
 3. Stevens argues fire investigators should give the homeowner reasonable advance notice of their reentry unless they have probable cause to believe the crime of arson has occurred.
- H. Dissent (Rehnquist, Chief Justice, Blackmun, and O'Connor).
1. Finds the plurality's distinction from *Tyler* to be inconsequential.
 2. Allows search of Clifford basement, but does not allow evidence from search of remainder of house.

BURN SIMULATION

In order to use the theories discussed in this course, you will be assigned to the investigation of an actual burn scene that the National Fire Academy (NFA) has produced. Each fire scene was developed in the burn buildings located on the campus of the NFA. They have been set up and burned prior to this course. Students do not participate in the setup and burn, only in the unit exercise. You will be assigned to a team and fire scenario. Your team will conduct a full investigation for probable origin and cause, including scene reconstruction. **This activity is physically demanding.** There will be eight separate burn scenes used for this activity.

As mentioned above, you will be assigned to a team and to a (only one) fire scene for which your team will be responsible. Actual team responsibilities will be explained in detail prior to this exercise. Your team is to concern itself only with the interior of each scene (interior wall to interior wall). Each team also will receive a brief written description of the available facts pertaining to the scene. You will be given time to review this information prior to starting your scene examination. Remember, you are dealing with possibilities/probabilities; therefore you must consider more than one possible solution to the fire. Because these scenes were arranged to simulate situations you may encounter in day-to-day duties, you will need to consider both accidental and incendiary fire causes. As you process the fire scene consider all aspects of fire behavior. The chart below characterizes what you will see, what you will investigate, and what you will determine to be your origin and cause of the fire.

