

**SANTA BARBARA  
SHERIFF'S OFFICE  
FORENSICS UNIT**

**CRIME SCENE SAFETY MANUAL**

**1.0 INTRODUCTION**

Members of the Crime Scene Unit have the ultimate responsibility to recognize potential hazards that can exist during a crime scene investigation, whether processing an outside scene or one that occurs inside a building. Human error, along with a lack of knowledge of safety procedures and ignorance of hazards associated with a crime scene environment are factors affecting the occurrence of accidents. No manual or guidelines can be expected to cover every aspect of crime scene safety; however they can address the potential hazards, the most current safety practices and the methods available to help insure the safest possible working environment at a crime scene. If safety practices are followed and common sense is used, needless accidents as well as injuries and health problems that may be associated with working in a crime scene environment can be avoided.

**2.0. ROUTES OF EXPOSURE**

The crime scene can be a source of contamination from a variety of potentially hazardous materials. Exposure to infectious human blood or other body fluids, chemicals and other hazards associated with sharp objects such as broken glass and hypodermic needles are inherent risks associated with crime scene investigations and evidence collection. In order for the crime scene response team members to better protect themselves, a general understanding of the potential routes of exposure is provided in the following text along with the proper ways in which to minimize or protect one from these exposures.

**2.1 Inhalation**

- a. Inhalation of airborne contaminants may cause simple respiratory irritation, respiratory destruction or may enter the bloodstream via the lungs potentially causing liver, kidney, heart and central nervous system damage.
- b. Adequate ventilation can help minimize some airborne contamination depending on the situation. In extreme cases, respiratory protection should be used.

**2.2 Skin Contact**

- a. Skin contact is probably the most frequent route of entry into the body encountered at crime scenes. Skin contact can result in two types of health effects. One is localized affecting the area of contact resulting in irritation, redness, swelling or burning. The other involves a systemic effect, in which the substance is absorbed through the skin and circulated throughout the body. This can cause such things as dizziness, tremors, nausea, blurred vision, shock, organ damage and collapse.

- b. Most exposures can be prevented by the use of appropriate gloves, safety goggles, safety glasses, face shields and protective clothing.

### 2.3 Ingestion

- a. Ingestion involves the entry of either chemicals or biological contaminants through the mouth. Ingestion of a corrosive chemical can cause damage to the mouth, throat, and digestive tract. When swallowed, toxic chemicals can be absorbed through the intestines and stomach.
- b. Exposure at crime scenes caused by ingestion of chemicals or biological contaminants can be prevented by not allowing food, drinks or smoking in areas that might be contaminated. Outside of these areas hands should be washed before eating, drinking or smoking.

### 2.4 Injection

- a. Injection of chemicals or potentially infectious materials usually occurs with needle pricks and/or mechanical injuries caused from contaminated glass, metal or other sharp objects. This type of injury will lead to the direct injection of the contaminants into the bloodstream.
- b. Protect yourself by safely handling all sharp objects or those with jagged edges. Package these types in puncture resistant materials and place warning labels on packaging to prevent others from potential harm from these objects.

## 3.0 SAFETY

### 3.1 Basic Safety Precautions

- a. Gloves will be worn at all times when handling blood and biologically stained materials and/or other potentially hazardous chemicals at a crime scene.
- b. Gloves will also be worn while handling bodies.
- c. Additional protective clothing such as disposable lab coats, booties, gloves and caps can also be worn as needed.
- d. No smoking, eating or drinking will be allowed while processing the crime scene. When taking a break away from the immediate crime scene area, protective clothing such as gloves must be removed and where possible hands should be washed before eating or drinking occurs.
- e. Any evidence transported back to the laboratory or transferred to another agency from the crime scene will be packaged in such a manner that protects both its integrity and those that might handle the evidence. DO NOT place blood-stained materials in plastic bags unless extenuating circumstances warrant the use of plastic.

- f. Non-disposable items such as forceps, scissors, evidence placards, and other tools used at the crime scene will be placed in the appropriate containers for later decontamination at the laboratory.
- g. All disposable protective clothing (gloves, booties, etc.) and other disposable items used while processing the scene will be disposed of at the scene or placed in a receptacle to be transported back to the laboratory for disposal. Items stained with liquid body fluids will be placed in a container to be disposed of as hazardous waste at the laboratory.
- h. Due to the late and potentially long hours spent processing crime scenes, take frequent breaks and rest when necessary especially when working in extremely hot environments.
- i. Be cautious driving to and from a crime scene. Weather, late nights, and long hours can cause driving hazards.

### 3.2. Blood-Borne Pathogen Safety Measures at Crime Scenes

Universal precautions must be used at crime scenes. CSI unit staff must treat all human blood, body fluids, or other potentially infectious materials as if they were infected with blood-borne diseases such as hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV).

- a. Barrier protection such as disposable gloves must be worn at crime scenes when handling potentially infectious material. Gloves should especially be worn if the crime scene investigator has cuts, scratches or other breaks in the skin. Hepatitis B and C do survive in dried bloodstains, HIV does not.
- b. Gloves must be changed when they are torn, punctured or their ability to function as a barrier is compromised.
- c. Coveralls and shoe covers can also be worn to create a barrier against potentially infectious material.
- d. Wear appropriate eye protection in the form of goggles, safety glasses, or a face shield to protect against splashes, sprays and spatters of infectious materials. Similar precautions should be taken when handling dried bloodstains.
- e. All contaminated sharps will be placed in the appropriate closeable, leak proof, puncture-resistant containers for transportation or disposal.
- f. All containers with potential biological hazards will be labeled as a Biohazard or with a *BIOHAZARD* label for transportation or disposal.

- g. No eating, drinking, smoking or applying cosmetics will be allowed while processing a crime scene when human blood, body fluid or other potentially infectious material are present.
- h. Remove gloves and/or other personal protective equipment (PPE) in a manner that will not result in the contamination of unprotected skin or clothing.
- i. Hands will be washed after removing gloves and PPE.
- J. No eating, drinking, smoking or applying cosmetics after processing the scene is allowed until gloves and any personal protective clothing is removed.
- k. All contaminated equipment will be decontaminated after use with a solution of household bleach diluted approximately 1:10 or another suitable disinfectant.

### 3.3 Non-Routine Crime Scene Pathogens

Non-routine pathogens are potential biohazards that one does not normally associate with a crime scene. These pathogens can pose a real health hazard if the crime scene investigator is not aware of the potential occupational hazards when processing a crime scene.

- a. Anaphylactic Shock
  - 1. An allergic reaction that can be life threatening due to extreme sensitivity to a particular allergen such as an insect sting or a spider bite.
  - 2. Forensics unit response team members who have an extreme sensitivity to known sources of allergens should be extremely cautious at crime scenes. These persons may be more sensitive than other members of the team to certain allergens and may be more prone to a severe reaction than others.
  - 3. All crime scene response team members will wear the appropriate personal protective equipment when searching scenes and moving objects around crime scenes. In some cases, leather work gloves are more appropriate outerwear than laboratory latex or nitrile gloves.
- b. Hanta Virus
  - 1. Found in rodent urine, feces and saliva of rodents and other small animals.
  - 2. Infection can occur when dried material contaminated with excreta is disturbed. Entry can be through broken skin, through the eyes, animal bites and possibly through ingestion of contaminated food or water.
  - 3. For areas with a confirmed case of Hanta virus infection or buildings with heavy rodent infestations, use respiratory protection with at least a High Efficiency Particle filter respirator.

4. Gloves should be worn when searching an area, especially one that might contain rodent infestations.
- c. Lyme Disease
1. Lyme disease is the result of tick bites usually carried by rodents.
  2. Symptoms include a reddish circle (like a target) on the skin that gradually expands, flu-like symptoms, and joint inflammation.
  3. For outdoor crime scenes that are known to have populations of rodents carrying Lyme disease, the best protection is to cover the exposed skin areas. In some cases, the use of insect repellants may be appropriate.
- d. Pulmonary Tuberculosis (TB)
1. TB is caused by *Mycobacterium tuberculosis* and is commonly transmitted from person to person by the aerial route. The bacterium can be expelled during episodes of coughing, sneezing, and talking leaving airborne bacteria for long periods of time.
  2. These bacteria are susceptible to ultraviolet light, and transmission of the disease rarely occurs outdoors in the daylight.
  3. In order to minimize the possibility of an exposure, it is important to provide fresh ventilation to any area where there is a known or expected exposure.
  4. Surgical-type masks or respirators can also be worn to prevent the crime scene investigator from coming into contact with the airborne bacteria.
- e. Poison Oak, Poison Ivy, or Sumac
1. These substances contain a harmful resin called urushiol that will cause itching, burning and blistering in the area of contact. Highly sensitive personnel may develop severe reactions.
  2. Be aware at crime scenes of the substances that are not directly related to the scene. Poison oak is described as leaves having three leaflets and grows as vines or bushes.
  3. Wearing clothing that protects exposed areas of skin such as gloves and long sleeves can help prevent exposure. After touching various plant materials with gloves, avoid contact with the face or other exposed skin areas.
  4. Crime scene response personnel who have a hypersensitivity to poison oak or are highly allergic to other similar substances should notify their unit Supervisor. Field assignments will be made appropriately for those individuals.

- f. Tetanus
  1. Tetanus is caused by spores of bacteria found in soil/manure and usually enters the body after a puncture injury.
  2. Be aware and cautious at crime scenes. Take care not to walk on surfaces of an unknown nature where exposed nails and other sharp objects could penetrate the shoe or other areas of the body.
  3. Tetanus is completely preventable by vaccination. Crime scene response personnel should obtain booster shots every 10 years or at the time of a puncture injury if it occurs 5 years after a dose. This includes human bites.
- g. Rabies
  1. An acute viral disease caused by the transmission of infected secretions, such as saliva from an animal that has been infected.
  2. Be aware of your surroundings at crime scenes. Loose dogs or other animals should be avoided, unless the history of the animal is known. Even if the animal is not infected, use caution if an animal approaches a crime scene.
  3. Animals are always unpredictable especially at crime scenes. Therefore, it is best to let others (such as animal control personnel) handle any animals found at crime scenes even if they are the family pets.
  4. If you are bitten by an animal at a crime scene, seek immediate medical attention. An infected animal licking over damaged skin can also cause infection.
- h. Rocky Mountain Spotted Fever
  1. Rocky Mountain Spotted Fever is caused by a parasitic microorganism. Transfer of this disease is by the bite of an infected insect (like a tick), or through their feces.
  2. Use insect repellent in tick-infested areas as a precautionary measure. If ticks are found on your body during or after a crime scene, gently pull away ticks (by the head) with forceps and remove from your body.
- i. San Joaquin Valley Fever
  1. "Valley Fever" is caused by the inhalation of a mold that grows in the soil. The symptoms are limited and have an incubation period 10-30 days. Symptoms may include influenza-like illness, headache, cough, fever and fatigue.

2. Wearing a particle mask/respirator in certain areas and being particularly cautious when disturbing dust and dirt may limit your exposure at crime scenes.

#### J. Snake Bites

1. Most toxic snake bites are basically of two types: neurotoxic (e.g., coral snake) causing respiratory paralysis and cytotoxic (e.g., rattlesnake) causing local pain, redness, swelling and forcing the flow of blood out of the surrounding tissue.
2. Be cautious at crime scenes especially in those areas known for their snake population. When searching at crime scenes for evidence, impeding objects should be moved with care. Move objects away from your body and keep away from face (i.e. lift box up with edge furthest away from you).
3. If you are bitten by a snake known to be venomous or a snake of unknown type (you may be asked to describe snake), immobilize yourself and keep the area bitten in a horizontal position. Have your crime scene partner or others at the scene seek immediate medical attention for you. Keep calm.

#### k. Spider Bites

1. Most spider bites only produce localized pain, swelling and redness. Death from cardiac arrest or respiratory failure is usually uncommon in adults. A Black Widow (which is more venomous) may cause generalized muscular pains, muscle spasms starting at the site of the bite which may spread. Symptoms may continue for days after the initial bite.
2. One of the more toxic spider bites is that from the Brown Recluse Spider. At the present time, there is no proven treatment. The bite of the Brown Recluse Spider may lead to the death of local tissue, requiring medical attention.
3. Again, be cautious when searching crime scenes. In some cases, it may be advantageous to wear heavy work gloves when searching areas that might be breeding grounds for spiders.

### 3.4 Chemical Safety at Crime Scenes

There are a variety of materials (which may or may not be essential to the crime scene investigation) with which the crime scene investigator might come into contact with. These materials may have the potential for creating health and safety hazards for the crime scene response personnel depending on their flammability, age, and storage.

- a. Do not create sparks or flames in and around flammable or combustible materials such as gasoline, acetone and ether.
- b. Be cautious of explosive materials such as nitroglycerine and nitroglycerine-based dynamite, which can become unstable as they deteriorate over time. All explosive

materials are sensitive to heat, shock, and friction. Ether will form peroxides around the mouth of its container which is explosive.

- c. Some chemicals such as phosphorus, sodium and barium (liquid or solid) can ignite in air at temperatures less than 130 degree Celsius without an external ignition source.
- d. Improperly stored materials found at crime scenes may create additional hazards. Oxidizers such as nitrates, hydrogen peroxide and concentrated sulfuric acid can promote combustion. Be cautious of improperly stored materials such as flammable and combustible material or substances that could rapidly accelerate its decomposition.
- e. Corrosive materials not directly involved in the crime scene can also be encountered. This material can cause destruction to living tissue or objects such as wood or steel. Corrosive material, depending on their concentration and duration on a particular type of material, may cause the objects to become structurally unstable and may cause physical hazards at the scene.
- f. If a crime scene response member comes into contact with or comes across unknown potentially hazardous chemicals at a crime scene, they should consult with agencies such as the Department of Justice Crime Lab (Santa Barbara). Information obtained from these sources should begin with a determination of whether or not the scene can be processed safely. Other information should include the hazardous properties, disposal techniques, personnel protection requirements, packaging requirements, and proper disposal of the hazardous material.

### 3.5 Light Source Safety at Crime Scenes

- a. The eyes must be protected when using ultraviolet (UV) light, alternate light sources (ALS), lasers and other light sources that may damage the eyes by either direct or indirect exposure to the light. Irreversible eye damage can occur even with reflected beams.
- b. Never directly stare into the light source.
- c. Wear the appropriate eyewear for the type of light being used. Safety eyewear dedicated for use with the alternate light source should meet ANSI Z80.3 special purpose UV requirements (the lenses block 100 % UVB & 100 % UVA). Goggles must have sufficient protective material and fit properly to prevent light from entering at any angle.
- d. Do not stare directly into the beam of the laser trajectory device.
- e. Special precautions must be taken when using a laser at a crime scene. Wear laser protective eyewear approved by the American National Standards Institute (ANSI) rated to protect against the maximum operating wavelength of the laser source.



- f. Prolonged exposure to the skin should also be avoided. When appropriate, long sleeves and gloves can be worn.

### 3.6. Blood Enhancement Chemicals at Crime Scenes

- a. CSI staff members do not frequently use blood-enhancing chemicals at crime scenes.  
However, DOJ Crime Lab Criminalists do use these chemicals. All members of staff in the area of blood-enhancing chemical use needs to be familiar with the safety precautions.
- b. Wear gloves when using blood-enhancing chemicals such as luminol, amido black, and leucocrystal violet.
- c. Use sprayed blood-enhancing chemicals only in well ventilated areas.
- d. Do not spray blood enhancing chemicals in a relatively confined and unventilated area. If possible, remove the item from the area or add ventilation to the area
- e. In some circumstances, spray devices may use some form of hydrocarbon as a propellant that might be flammable. DO NOT use these particular devices near an open flame especially where there is little ventilation. DO NOT expose these types of spray devices to extreme heat as they may expand and could explode.

### 3.7. Working in Confined Spaces at Crime Scenes

On occasion a crime scene may occur or a body may be located in a confined space. A confined space is an enclosed area with limited or restricted means of entry/exit that is not large enough for crime scene personnel to enter and work in. A confined space is not designed for continuous occupancy such as tank cars, vats or open pits. Confined spaces are by their nature hazardous due to the possibility of toxic gases, explosive or oxygen-deficient atmospheres, electrical dangers and/or materials that have the potential of trapping the crime scene member.

- a. Never enter a confined space until:
  - 1. All atmospheric, engulfment and mechanical hazards have been identified;
  - 2. A plan has been developed to address the hazards identified;
- b. In certain circumstances a "Confined Space" permit must be placed near the entrance to the confined space to meet OSHA requirements.
- c. Remove all unwanted energy sources and/or hazardous substances from the confined space before entering.
- d. Use forced-air ventilation and make sure that the ventilation equipment does not interfere with entry, exit or rescue procedures.

- e. Continuously monitor for oxygen, combustibles and toxins during the crime scene processing of the confined space. Conditions can change at any time.
- f. Keep communication lines open between personnel entering the crime scene and outside personnel. It is best to have a back-up plan if using only two-way radio communication.
- g. Use the buddy system when entering the confined space.
- h. Always wear personal protective equipment (PPE) when entering a confined space.
- i. Safety belts and harnesses must be worn where appropriate.

### 3.8. Physical Safety at Crime Scenes

- a. Depending on the scene, protect yourself from falling debris by wearing head protection such as a hard hat.
- b. Be aware of your surroundings. Due to the vast number of different types of areas that crime scenes can occur in, the crime scene response team member must pay attention to their surroundings in order to prevent slips, trips and falls. It is very easy, especially in a cluttered crime scene environment, to find yourself tripping over an item. In addition, rural areas such as fields and grassy areas often have un-level terrain and hidden dangers, such as barbed wire, animal holes, booby traps and dried debris.
- c. Avoid sunburns! Protect yourself from the sun, by using sunscreen, wearing long sleeves and a hat.
- d. Avoid dehydration! Take breaks and drink plenty of water.

### 3.9 Choosing and Using the Proper Personal Protective Equipment (PPE) at Crime Scenes

#### a. Types of Hand Protection

The selection of hand protection is based on the type of material being handled and the potential hazards associated with that material if known.

1. **Nitrile** gloves provide protection from acids, bases, hydraulic fluid, aromatics, petroleum and chlorinated solvents. They also can offer some resistance to cuts and snags.
2. **Latex (natural rubber)** gloves will resist mild acids, caustics, detergents, germicides and ketonic solutions. When exposed to prolonged heat (e.g., left in a crime scene vehicle) or direct sunlight these gloves will start to degrade, causing the glove material to lose its integrity. Latex will also swell and degrade if exposed to gasoline or kerosene.

Some personnel may have an allergic, sometimes extreme allergic, reaction to natural rubber gloves (latex) and therefore should use a different type of glove, such as nitrile or neoprene, when processing a crime scene. Powder-free gloves with reduced protein content will lower the risk of developing latex allergies in some people.

b. General Guidelines for Using Gloves

1. Inspect gloves for holes, punctures and tears before donning. Faulty gloves should not be worn. Remove rings or other sharp objects that can puncture the gloves.
2. Wear double layers of gloves especially when working with contaminated materials.
3. Change gloves often when handling biological materials. Also change gloves when these are torn or punctured or when they can no longer function properly as a barrier.
4. Remove disposable gloves in a manner that will decrease contamination of unprotected skin or clothing by pulling them off by grasping the cuffs and pulling them off inside out. DO NOT reuse. Dispose of in an appropriately marked container.

c. Eye Protection

1. When handling biological or chemical materials at crime scenes, wear appropriate eye protection such as safety glasses and/or goggles when necessary. Face shields should be worn when there is a potential for splashing due to the fact that they offer better protection to the face. However, face shields alone are not considered appropriate eye protection and must be worn in combination with safety glasses or goggles.
2. Crime scene response personnel who normally wear prescription glasses should wear protective eyewear over their prescription glasses when appropriate.
3. Crime scene response personnel who wear contact lenses should also wear safety glasses or goggles especially when handling chemicals or in areas that might be irritating to contact wearers.

d. Foot Protection

1. Crime scene response personnel must wear shoes that completely cover and protect the foot. No open-toe shoes will be allowed at crime scenes.
2. Shoe covers should also be worn in heavy biologically contaminated areas

or when it is necessary to prevent contamination outside of the crime scene. This would also prevent outside contamination when entering a crime scene.

- 3. Steel toe boots may be necessary for work in arson and bomb scenes.

e. Respiratory Protection

- 1. In most circumstances (except in clandestine laboratory or bomb scenes) respiratory protection will not likely be necessary during the investigation of a crime scene. However, in those cases involving a decomposed or decomposing body, a full or half face respirator can be used, if available, to help minimize the odor associated with decomposition.
- 2. When it is known that the victim of a homicide has a disease that can be transmitted from person to person by the aerial route (ex: tuberculosis) then the necessary respiratory protection should be used when investigating the scene.

f. Head Protection

- a. Protective helmets such as hard hats should be worn at scenes where structural damage is present or where there is a chance that objects may be unstable.

**IV. REFERENCES**

1. *Handbook of Forensic Services: Crime Scene Safety*, U.S. Department of Justice Federal Bureau of Investigation, 1999.

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2012	Sgt. R. Cintron/2281		11/13/12