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Personnel Duties and Responsibilities

The Crime Scene Section is responsible for completing numerous duties during crime scene investigations. These duties include the recognition, documentation, collection, preservation and processing of evidence. The processing of crime scenes and any subsequent follow up investigations can be divided into various assignments to ensure that all duties are completed. Incidents such as homicides, officer involved shootings, or other major events may require numerous personnel under the direction of a Crime Scene Supervisor.

Use of the word “should” within any guideline description of this Technical Manual will be understood to imply “will” and may not be modified for use in casework without an explanation in the analyst notes or case record.

1 Notes

Every crime scene and all evidence analysis conducted by Crime Scene personnel will be documented with contemporaneous and thorough notes as prescribed in the Reporting Guidelines chapter of the Crime Scene Standard Operating Procedures.

2 Photographer

Most scenes that warrant a Crime Scene Specialist response will be photographed. Various scenes that a Property Crime Technician responds to should be photographed as well. Photographers are responsible for thoroughly photographing the crime scene, items of evidentiary value, and any related matters as prescribed in the Photography chapter of this Technical Manual.

3 Videographer

Various crime scenes, reenactments, and special events will require videotape documentation. Videographers are responsible for thoroughly videotaping the crime scene, items of evidence, reenactments with audio and special events as prescribed in the Videography chapter of this Technical Manual.

4 Search Methods

Most crime scenes require a thorough search be conducted for the presence of potential evidence and specific observations to be made. Various scene conditions and evidence, e.g., attempted points of entry, items removed from the structure but deposited nearby, etc. will only be located through a systematic and methodical search. Several methods are described in the Search Methods chapter of this Technical Manual.

5 Sketch Preparer

Various crime scenes will require documentation through sketching. Sketch preparers are responsible for thoroughly sketching the crime scene to include the location of evidentiary items as prescribed in the Sketching chapter of this Technical Manual.

6 Evidence Recovery

.01 Evidence will be completely documented as found prior to any scales or tent markers being placed or evidence collected.
.02 Ensure that all necessary evidence processes are conducted.
.03 The investigator and or supervisor should be advised when any additional evidence is located during the search/examination of the scene.
.04 The investigator must be notified prior to evidence collection, if present.
.05 If the investigator suggests that certain items of evidence will need to be rushed or specially processed, arrangements should be made to accomplish this task.
.06 Securely transport evidence to the laboratory and ensure that a chain of custody is completed for each item before relinquishing direct custody.
.07 All evidence, especially latent prints, should be retained no longer than necessary and entered into Versadex as soon as practical.
.08 Evidence should be properly identified, labeled and packaged as prescribed in the General Evidence Handling chapter of this Technical Manual.

7 Physical Evidence Processing

Different physical and chemical processes are utilized to assist in the search and development of potential evidence. These processes must be used in proper sequence – beginning with the least destructive method and continuing to the most destructive. Before using a chemical process in the field or in the laboratory, a positive control must be used to test the reagent. It is at the discretion of the analyst to determine the proper sequential method(s) for processing. The processes and methods used will be documented in the case record – including the lot number of any reagent used.

PHOTOGRAPHY

1 Crime Scene Photography

Photographs will be taken in such a manner as to provide clear, undistorted high quality images which document the condition of the crime scene, evidence, and persons related to a criminal investigation. No 'time stamp' function will be used.

.01 Objectives

- To record the condition of the scene before alterations occur
- To record the location of the scene
- To record the position and condition of evidence
- To document the point of view of the persons involved and witnesses
- To document the spatial relationships of pertinent items
- To convey the look of the scene to investigators, attorneys, and jurors who will not have the opportunity to view the scene first hand
- To use as a tool for crime scene reconstruction efforts
- To assist in portraying an accurate picture of the crime scene during courtroom testimony
- To refresh the photographer's memory of the scene

.02 Types of Crime Scene Photographs

- Long Range/Overall
  - Provides an overview of the scene establishing the location of the crime, to include addresses, street signs, business names, landmarks, outside and surrounding areas. Indoors, this includes photographs of a room from all four corners to show the layout of the room and furnishings.
- Mid-Range/Relationship
  - Provides a view of spatial relationships of items and evidence within the scene. Mid-range photographs set up the close-up photographs of individual items of evidence.
- Close-up
  - Provides detailed photographs of individual items of evidence. If possible, should be taken at a 90 degree angle to the subject. Indirect lighting techniques (oblique, bounce, ambient) and/or a tripod should be utilized when necessary.
- Scaled/Comparison
  - Close-up photographs that include a ruler provide scaled, detailed documentation of individual items of evidence. They are necessary in order to produce an accurate one-to-one photographic reproduction to use for examinations or comparisons.
  - Photographs that must contain a scale include those of latent prints, patent prints, impressions, blood spatter, projectiles, defects from projectiles, tool marks, and injuries to skin.
  - Scaled photographs should also be taken anytime the relative size and location of an item needs to be documented.

- The scale must be on the same plane as the subject, if possible. The photograph must be taken at a 90 degree angle to eliminate distortion that could render the photograph unusable for examinations and or comparisons.
- The scale may be marked with the photographer initials and employee number, the LIMS number or offense number, and the date in a way that does not interfere with the markings on the scale.
- Although the scale is a necessary requirement, it should be placed on the edge of the photo and not fill any more of the frame than is necessary.
- Indirect lighting techniques (oblique, bounce, ambient) and/or a tripod should be utilized to ensure that a clearly focused image is achieved.

.03 Photo Sheet or Slate

- A photo sheet should be the first image taken and should contain the following information:
  - Offense number and LIMS number (if known)
  - Offense title
  - Date the images were taken
  - Location of the scene where images were taken
  - Name of photographer and employee number
- Images from more than one offense may be placed onto the same media card only if the offenses are separated by a photograph of the photo sheet.
- No images will be reproduced, copied, or stored on personal media devices or APD computer systems (with the exception of the DCSMS).
- Video will not be placed on the media cards.

.04 Deletion of Images

- Crime scene images will not be deleted. All images from the field, including poor quality images, will be downloaded.

.05 Digital Crime Scene Management System (DCSMS)

- Crime Scene photographs and images are considered evidence and will be stored in the DCSMS.
- The DCSMS is considered the secured APD image database.
- Every image will be stored in the DCSMS under the Versadex case number and referenced to the LIMS case number.
- With the exception of the LIMS number, and in some instances the case number or import group, the Case Panel information will not be modified.
- The images will be listed in LIMS as an item; the chain of custody will be tracked in LIMS and will be shown as released to the DCSMS storage location, with the date and time entered into Comments.
- Scene description information should be added to the “Call” panel fields within DCSMS.
- Employees should download all images into DCSMS by the end of shift.

- Employees will add the photographs as an item entry into LIMS (only) with a brief description – including the date and collection time and with a final storage location of DCSMS (not CEL).

.06 Care of Photographic Equipment

- Personnel are responsible for examining issued equipment for damage and ensuring that it functions properly. A Crime Scene Supervisor will be notified of any damaged or broken equipment. Soiled equipment will be cleaned immediately.
- The camera equipment (cameras, flashes, cords, etc.) is not waterproof and therefore cannot be subjected to any moisture. Care will be taken when photographing in inclement weather. A rain cover may be obtained from the Equipment Room for use in protecting the camera from precipitation.
- Sudden temperature changes (e.g., very cold to very warm) can cause the lens to fog. This can be prevented by letting the camera acclimate to the different temperature slowly (e.g., standing in the open doorway to a warm home for a few minutes when it's very cold outside). The viewfinder can be wiped off with a soft cloth if it gets fogged. If the lens is fogged, images cannot be taken until the lens becomes clear.
- Avoid strong magnetic fields. Never place the digital cameras in close proximity to electric motors or other equipment generating strong electro-magnetic fields as this may cause malfunctions or corrupt image data.

2 Painting with Light

This technique is used to illuminate large crime scenes or areas of evidence that are in darkness. It is performed by keeping the camera at a fixed point, with the shutter continually open, and engaging the flash throughout the length of the scene. It is best performed with two persons.

.01 Equipment

- DSLR camera
- Flash unit
- Media card
- Tripod
- Scale
- Shutter release remote control
- Dark card to cover lens
- Flashlight

.02 Procedure

- Set the camera on a tripod.
- Set the camera's shutter speed on "bulb" and the aperture to 5.6 or larger.
- If the photograph is of a general area, manually focus to just before "infinity". Otherwise, manually focus on the subject.
- Utilize wireless remote control for shutter.

- Place a dark card in front of lens.
- Open the shutter using the remote control and lock it open.
- Remove the card from in front of the lens, and engage the flash inside the scene. Cover the lens with the card again. Repeat until the scene has been illuminated thoroughly.
- Close the shutter using the remote control.
- Never aim the light source directly back at the camera.
- Do not move the camera while the shutter is open.
- Do not come between the lens and the flash when the flash is engaged.
- Do not pause while walking in the scene when the lens is uncovered.

3 Photographing Persons

Persons are photographed for documentation of injuries, identifying marks, and/or evidence on persons. This is usually performed at the request of an investigator.

.01 Equipment

- Camera
- Flash unit
- Media card
- ABFO Scale (American Board of Forensic Odontology) – should be used for rounded or irregular surfaces, such as skin.

.02 Procedure

- Obtain subject's name, date of birth, and location of injuries, identifying characteristics, and/or evidence.
- Take a full frontal body photograph, including shoes.
- Take a full frontal face photograph.
- Take mid-range photographs to show location of injuries, identifying characteristics, and or evidence.
- Take close-ups alone and close-ups with scale of each injury, identifying characteristic, and or area of evidence. The scale must be on the same plane as the injury, identifying characteristic, or evidence. Close-ups must be taken at a 90-degree angle, if possible. The scale must not obstruct the subject area and the images must be clearly focused.
- The body part should be immobilized (e.g., place hand on top of table) to prevent blur in the photograph.
- An ABFO scale will be used when photographing bite marks.
- For injuries, photograph before and after wound is cleaned, if possible.
- Photographing injuries on private areas (of same sex and opposite sex) is acceptable only if requested by the investigator and approved by a supervisor. This approval will be noted in the case record.
- The photographer will have another person in the room with the subject while photographing injuries on private areas.
- Any other photographs will be taken at the request of the investigator.

4 Photographing Vehicles

Vehicles are photographed to document their location, condition, and any evidence present on the exterior and/or interior.

.01 Equipment
- Camera
- Flash unit
- Media card
- Scale

.02 Procedure
- Take overall photographs showing location of vehicle in scene.
- Photograph all four sides of vehicle at a 90-degree angle.
- Take mid-range photographs that are in line with the vehicle's axels on both sides.
- Take close-up and scaled photographs of damage or evidence on vehicle. Utilize oblique, bounce, or ambient lighting if surface is shiny, curved, or reflective.
- If damage is directly on a corner of the vehicle, take 90-degree photographs from both directions.
- If accessible, document the interior of the vehicle and any other areas as requested by investigator.

5 Photographing Collision Scenes

This section provides the guidelines for documentation of collision scenes using photography.

.01 Equipment
- DSLR camera
- Flash unit
- Media card
- Scale

.02 Procedure
- Make contact with the investigator on scene.
- Take overall photographs of the scene, including relevant street signs and take photographs from the point of view of any witnesses.
- Determine the paths of vehicles involved. Take overall photographs of the path of each vehicle.
- Photograph the path/skid at approximately every 10 steps (or less for small scenes). Begin photographs 30-50 feet away from where skid starts. Skid will show up with more clarity in a photograph when the camera is lower to the ground.

- Photograph vehicle(s) and damage using guidelines of Photographing Vehicles.
- Photograph each vehicle's tires, seatbelts, and airbags (if deployed).
- Photograph damage to private and public property resulting from the collision.
- If there are injuries to persons on scene, photograph injuries using guidelines of Photographing Persons.
- If the collision is a Traffic Fatality and the decedent is on scene, photograph the decedent by taking full body and facial photographs as well as photographs of visible injuries.
- Photograph any additional areas or evidence at the request of the investigating detective.

6 Photographing Friction Ridge Evidence at Crime Scenes

Photographic documentation of friction ridge prints at crime scenes will be used if the friction ridge impression(s) cannot be collected or if collection attempts may damage the evidence. Documentation of friction ridge prints using photography is subject to further analysis by a latent print examiner. The impression images will be transferred to the Digital Crime Scene Management System (DCSMS) initially and a separate compact disc, of only the friction ridge evidence, will be made and submitted thereafter.

.01 Equipment

- Digital Camera
- Flash unit
- Media card
- Scale(s)
- Tripod

.02 Procedure

- Overall and mid-range photographs must be taken to show the location and orientation of the impression(s).
- Close-ups should be taken with the camera attached to a tripod.
- The camera lens opening should be at a 90-degree angle to the impression.
- The impression(s) must fill the frame of the camera ensuring that larger impressions are segmented into still smaller sections for greater detail.
- Take close-up photographs using oblique lighting or ambient light.
- Repeat close-up photographs with a scale and oblique lighting. Refer to the Scaled/Comparison chapter within the Photography section.
- It is the photographer's responsibility to ensure that the friction ridge images from the scene are submitted to the Latent Print Section.
- After all images from the scene have been downloaded into the DCSMS, the photographer will transfer <u>only</u> the friction ridge images <u>with scale</u> to the appropriate image program (e.g., View NX). No other photographs from the crime scene should be included.

- A brief description will be added to each image indicating the location from which the friction ridge image was taken at the scene. The lab Item field will remain blank.
- Each image will be given an identifier in the form of the approved naming convention (e.g., L1204089.jm_01).
- The images will then be recorded onto a compact disc (CD).
- The CD containing the images will be properly packaged and submitted to the Evidence Control Section as latent print evidence (not as CD).

7 Photographing Shoe Print and Tire Impressions

Documentation of shoe and tire impression images using photography is subject to further analysis by an examiner. The impression images will be transferred to a separate compact disc and submitted to the Evidence Control Section only when necessary or requested.

.01 Equipment

- Camera
- Flash unit
- Media card
- Scale ("L" ruler, measuring tape)
- Tripod
- Flashlight

.02 Procedure

- Take an overall photograph of the area showing the location and orientation of the shoe or tire impression.
- Attach the camera to a tripod, if possible.
- Ensure that the camera lens opening is at a 90-degree angle to the impression.
- The impression(s) must fill the frame of the camera, ensuring that larger impressions are segmented into smaller sections for greater detail, if possible.
- Take close-up photographs using oblique lighting. Preview the best lighting angle by using a flashlight.
- When photographing three-dimensional impressions, set the camera on a high f-stop (small aperture) for good depth of field. When using a tripod, aperture-priority mode can be used.
- Take scaled photographs using oblique lighting from all four sides, if possible. The scale must be on the same plane as the bottom of the impression and the image must be clearly in focus.
- When documenting tire impressions, place a measuring tape along one side of the impression. Take photographs of the impression, including the measuring tape, for at least six feet of the impression, if possible. Overlap the photographs by approximately three inches on each side.

8 Photographing Luminol and Bluestar

This section provides the guidelines for documentation of unseen blood using Luminol or Bluestar and photography.

.01 Equipment

- DSLR camera
- Tripod
- Media card
- Scale wrapped in copper wire
- Timing device
- Shutter release remote control
- Flash unit or flashlight (optional)

.02 Procedure

- Organize the session so that the Luminol or Bluestar photographs can be taken in total or near total darkness.
- Take overall and mid-range photographs of the item/area onto which Luminol or Bluestar will be applied.
- Set camera ISO to 800.
- Attach the camera to a tripod; set up shutter release remote control; set shutter speed to “bulb”; set aperture to its largest opening.
- Focus manually on subject/area prior to turning off lights.
- When Luminol or Bluestar is applied, open shutter and keep it open for 45 to 60 seconds.
- Repeat as additional Luminol or Bluestar is applied, increasing duration of exposure by at least 15 seconds.
- A scale with copper bands at one-inch increments must be used for close-up photographs during Luminol or Bluestar photography.
- If desired, additional light (from a flashlight or a flash unit set at lowest setting) can be applied to the subject area by engaging the light in the opposite direction of the subject near the end of the exposure time. This will produce a “painting with light” effect. Do not aim the light source at the camera.

9 Photographing with the FLS at Crime Scenes

This section provides guidelines for photographing latent prints or other evidence at crime scenes that can be documented using a Forensic Light Source (FLS) and a digital camera.

.01 Equipment

- DSLR camera
- Scale
- Media card

- Tripod
- Shutter release remote control
- Forensic Light Source (FLS)
- Colored filters

.02 Procedure

- Take at least one overall photograph of the subject in normal light to show location and orientation.
- Attach the camera to a tripod; set up shutter release remote control; set camera on manual focus; turn off flash.
- Position the camera lens opening at a 90-degree angle to the subject.
- Coordinate the color of the lens filter with the color of goggles.
- Preview best lighting angle with the light source.
- Photograph in darkness.
- For photographs of friction ridge evidence, also refer to Photographing Friction Ridge Evidence at Crime Scenes.

10 Aerial Photography

Aerial Photography is used to document crime scenes or evidence by taking photographs from a plane or helicopter. Aerial photographs are taken at the request of the investigator who will coordinate the event.

.01 Equipment

- DSLR camera
- Media card

.02 Procedure

- Must be taken during daylight and at a time when the sun will not be directly facing the camera.
- Take extra media cards and camera batteries.
- Set the camera before take-off to “shutter priority” mode and shutter speed to 500 or faster.
- Focus the lens at infinity or use auto focus.
- Prior to take-off, discuss with the investigator the specific photographs to be taken.
- Wrap the camera strap around wrist or arm to keep the camera from falling out of the aircraft.
- For buildings, photograph at all four corners.
- Photograph roads in the area.
- Photograph at different altitudes (1000 feet, 500 feet, etc).
- Follow the safety instructions of the pilot or crewmember and keep seatbelt fastened at all times.

11 Photographing Autopsies

Crime Scene Specialists may be requested to assist with autopsy documentation. Autopsy photographs are used to document the external and internal examination of deceased persons in a morgue setting.

.01 Equipment

- DSLR camera
- Flash unit
- Media card
- Scale
- Tripod (optional)

.02 Procedure

- Take overall photographs of the body on both right and left sides.
- Photograph the front of the face, right and left sides of head, and top of the head at a 90-degree angle.
- Photograph the Medical Examiner (M.E.) identification tag, if present.
- Take mid-range photographs of the front of torso, back of the body, and areas of injury.
- Take close-up photographs of injuries, with and without a scale, following the guidelines of Photographing Persons. Do not use the M.E. prepared scale.
- When skin is retracted from the skull, photograph top of skull and the underside of the skin that has been retracted.
- Photograph the brain in the skull when the skullcap is removed and photograph the interior cavity of the skull once the brain and membrane have been removed.
- Photograph evidence removed from the body (e.g., bullet fragments), with and without scale.
- Take any other photographs at the direction of the investigating detective.

12 Photographing Blood Stain Patterns

Blood stain pattern photographs are used to document the location, condition, and pattern of blood stains for the purposes of crime scene reconstruction. Blood stain pattern photographs are subject to further analysis by an examiner. The blood stain images will be transferred to a separate compact disc and submitted to the Evidence Control Section only when necessary or requested.

.01 Equipment

- DSLR camera
- Flash unit
- Media card
- Scale
- Tripod (optional)

.02 Procedure

- Take overall and mid-range photographs of item or area containing the blood stain pattern.
- Take close-ups with a scale at a 90-degree angle to the blood stain pattern(s). Use a tripod when necessary.
- For large areas of blood spatter, visually separate the spatter into sections or patterns using yellow paper scales or other measuring device(s) to obtain horizontal and vertical references. In this case, mid-range and close-ups of each section/pattern will be photographed and each section/pattern area should be marked with an individual letter (or number) that differs from other marked evidence (wall "A").
- Take close-up photographs of all stains of interest, with and without a scale, such as several individual bloodstains within a pattern that show directionality. These photographs must contain both the section/pattern location as well as an individual label in order for the blood stain pattern analyst to know the location of the blood stain within the scene and within the pattern (wall "A" – stain "3" or "A3"). Re-photograph with overalls.
- On walls, be aware of the possibility of glare or "hot spots" from the flash due to paint sheen, and use slight oblique lighting or bounce lighting to keep the glare from obstructing the blood stain in the photograph.

13 Photographing Exemplars

Exemplar photographs are used for documentation of known source exemplars/ standards. These exemplars are obtained for the purpose of analysis/comparison by an expert against questioned evidence recovered from a crime scene. The exemplar images will be transferred to a separate compact disc and submitted to the Evidence Control Section only when necessary or requested.

.01 Equipment

- Camera
- Flash unit
- Media card
- Scale ("L" ruler, measuring tape)
- Tripod
- Butcher paper

.02 Procedure

- When photographing items in a lab setting, use a neutral background (e.g., butcher paper) so as not to distract from the subject matter.
- Attach the camera to a tripod, if possible.
- Take all photographs in well-lit conditions.
- Ensure that the camera lens opening is at a 90-degree angle to the object. A ladder may be used to achieve sufficient height for larger items such as clothing.

- Repeat close-up photographs with a scale, ensuring that the scale is on the same plane as the object. Utilize oblique lighting, if needed.
- The entire frame must be filled with the object and clearly in focus to ensure the best possible documentation for analysis purposes. The object may be segmented into smaller sections to show greater detail.
- When photographing objects on live subjects (e.g., footwear worn by officer/EMT, etc.), ensure that an identification photograph of the known subject is taken.
- Remove the object(s) from the live subject, if possible, or ensure that the object has been fully immobilized before photographing with scale.
- A good method for obtaining footwear exemplars is to place each shoe on its outer edge (opposite from the arch) at the edge of a flat surface such as a table. Using tape, adhere an L-ruler along the edge of the table under the shoe and photograph with the use of a tripod.

14 Property Crime Scene Photography

.01 Cameras are assigned to each Property Crime Technician for documenting property crime scenes and evidence, as needed. Property crime scenes are not routinely required to be photographed, but those scenes containing suspected blood, graffiti, hate crime propaganda, large monetary theft or damage, etc. should be photographed.

- In bright daylight, utilize the optical viewing window as it may be difficult to see the image on the LCD monitor.
- Continually review the images for clarity and composition while photographing. If an image is unsatisfactory, the image must be re-photographed until an acceptable image is achieved.
- Capturing close-up images:
  - Using the flash, take a subject photograph and examine the image. If the result is unsatisfactory due to too much light (or “hot spot”), turn off the flash and re-photograph the subject using ambient light or oblique light.
  - If an image is out of focus while using ambient light, a tripod should be utilized to immobilize the camera.
  - Guidelines for close-up photography will be followed as set forth in the Crime Scene Photography sections of this manual.

15 Digital Imaging Workstations

This policy applies to the equipment in the Crime Scene Laboratory used to capture selected latent print images developed from evidence items or other requested items for analytical or documentation purposes.

- The equipment constituting the digital capture stations should be visually inspected by each operator for functionality before use.
- In the event that the equipment constituting the digital capture stations is not functioning properly, a supervisor should be notified immediately.

.01 Image Capture:

- Turn the camera on and start the image capture software on the workstation. Set up the object to be photographed on the camera stand, along with a scale in inches.
- A scale must be used and all guidelines for close-up photography will be followed as set forth in the Crime Scene Photography sections of this manual.
- Capture the image after making the necessary exposure settings.
- Images should be captured in the highest quality JPEG format.
- The image capture software is closed and the photograph is viewed in the image browser.
- A brief description will be added to each image indicating the location from which the friction ridge image was taken, if applicable. Enter the Lab Item number of the item photographed.
- Do not perform any enhancement techniques utilizing software tools or alter the primary image in any way.

.02 Naming Convention:

- Each image must have a unique name.
- Image names will always begin with the LIMS number.
- The second grouping of information will be the initials indicating the name of the photographer.
- The last grouping will be the sequential numbering of the images photographed, with the first image beginning the '01' designation.
- Unique image names will have a period placed between each grouping of information, with the exception of an underscore before the sequential image number.
- An example of an image file name using this naming convention would be as follows: **L1012345.vg_01**

.03 Preserving Original Images:

- All selected images must be downloaded to the DCSMS for permanent storage.
    - The images will be entered as evidence in LIMS and may be listed in the report as an item of evidence.
    - The chain of custody will be tracked in LIMS and will be shown as released to the DCSMS storage location, with the date and time entered into Comments.
- Selected latent print images will also be transferred to compact disk (CD) as a service to the Latent Print Section for analysis.

- The CD Burning software will be initiated on the workstation and "Data Disc" will be selected as the data type.
- A new CD will be placed into the CD drive.
- With the image browser open, the thumbnail pictures of the captured images may be dragged and dropped onto the burning software screen.
- The Lab Case number will be entered into the CD volume label field.
- With an appropriate CD pen, each CD will be directly labeled with the following information: LIMS number with individual item number, employee initials/number, date created, and number of images.
- The CD will be placed in a paper sleeve and packaged in a latent envelope to be entered in the Versadex RMS as "Latent Prints".

.04 Personnel can view the images they download from any computer through the DCSMS link, unless the case is secured. In the event that a case is secured, a request can be made through the detective for access to view those images.

.05 Investigators will be directed to contact the Multi Media Section for image reproduction requests from the DCSMS.

VIDEOGRAPHY

1 Videotaping Crime Scenes

The Crime Scene Section provides video documentation of homicides, officer-involved incidents, and other scenes at the request of the investigator. Video documentation of the crime scene will be used in conjunction with digital photographs. The Crime Scene Section has several video kits. One is maintained in the Supervisor's vehicle and the others maintained in the Specialists' vehicles.

.01 Equipment

- Sony Digital Handycam
- Lithium batteries
- Sony Amateur Movie Light source
- Mini DV videotapes

.02 Procedure

- Insert a lithium battery into the back of the video camera. The life lengths differ for the different batteries. The life length of the battery may be reduced when using the LCD screen.
- Connect video camera to the light bracket. Insert battery into light source and connect light source to bracket.
- Ensure that the "null mini-plug" is inserted into the microphone input and the microphone is set to "Line" to defeat audio recording. Sound is not to be recorded at a scene unless specifically requested by the investigator.
- Ensure that the "Nightshot" feature is turned to "off".
- Ensure that the Focus is turned to "Auto" and Auto lock setting is "on".
- Insert a new videotape after turning on the camera.
- Prepare a photo sheet, or slate, containing the following information:
  - Offense number or LIMS number (if known)
  - Offense type
  - Date of filming
  - Location of filming
  - Videographer's name and employee number
  - Name of investigator (if known)
- Document the time when filming starts (either in notes or captured on the video).
- Turn the light source on and film photo sheet for 5-10 seconds.
- Film scene beginning with a slow 360-degree pan of exterior of scene. Film the entire scene including overalls, mid-range, and close-ups of evidence. Once filming begins, there should be no stops until the entire scene is documented.
- Walk slowly, pan slowly, and use zoom feature slowly while filming.
- When filming items close-up, zoom in slowly, film item, and zoom out slowly before moving on to the next item.

- When scene has been fully documented, turn camera off. Document the time that filming ends (either in notes or captured on the video).
- Film entire scene a second time with evidence tents in place.
- Once scene processing/filming has been completed, remove the videotape from the camera and push tab from “rec” to “save” to help prevent the videotape from being altered or erased.
- The videotape itself and the videotape case will have the following information documented on the outside:
  - Offense number or LIMS number (if known)
  - Offense type
  - Date of filming
  - Location of filming
  - Videographer’s name and employee number
- The videotape will be sealed in a completed evidence envelope (gray, 9x12, preferred) and submitted to the Evidence Control Section.
- The camera and light source will be fully dismantled for storage.
- The lithium batteries will be charged once they have been used, and new batteries will be placed in the video camera case.
- Three new videotapes should be kept in the video camera case at all times.
- Crime Scene Specialists will be responsible for ensuring each video kit contains charged lithium batteries and new videotapes as well as informing the Supervisor, in writing, of any malfunctioning or damaged video equipment.

2 Videotaping Re-enactments

The Crime Scene Section will videotape re-enactments at the request of an investigator. The investigator will coordinate availability of location, videographer, principals and prop items (doll, etc.) to be used during the re-enactment.

.01 Equipment

- Sony Digital Handycam
- Lithium batteries
- Sony Amateur Movie Light Source
- Mini DV videotapes
- Sony Cordless Microphone (transmitter and receiver)

.02 Procedure

- Obtain a verbal summary from investigator of scope of re-enactment prior to videotaping.
- Obtain information of person who will be performing the re-enactment:
  - Name
  - Date of birth
  - If APD employee, job title and employee number
- Insert AA batteries into transmitter and receiver of cordless microphone. Attach the transmitter to the primary subject. The videographer wears the

earpiece connected to the receiver. Both the transmitter and receiver must be set to the same channel.

- Remove null mini-plug from camcorder and insert the microphone plug on the receiver into the microphone plug on the camcorder. The camcorder microphone setting must be changed to "Mic" to enable audio recording.
- Test the microphone to ensure that it is functioning properly. Instruct the subject to speak clearly and to stay within 150 feet of the camcorder.
- Film a photo sheet for several seconds.
- While filming, have the investigator introduce the subject and state the date, time, location, and purpose of the re-enactment.
- Film the re-enactment, following the subject through the event including relevant points of view, actions performed, overalls, mid-range, and close-ups as needed.
- Document time when filming ends, either in notes or on video.
- Once the re-enactment has been completed, remove the videotape from the camera and push tab from "rec" to "save" to help prevent the videotape from being altered or erased.
- The videotape itself and the videotape case will have the following information documented on the outside:
  - Offense number or LIMS number (if known)
  - Offense type
  - Date and location of filming
  - Videographer's name and employee number
- The videotape will be sealed in a completed Evidence Envelope (gray, 9x12, preferred) and submitted to the Evidence Control Section.
- The camera and light source should be fully dismantled for storage.

3 Special Events

The Crime Scene Section will occasionally be requested to videotape certain special events (e.g. demonstrations, celebrations, high profile events). The requestor should coordinate what will be required from the videographer during the assignment, to include specific location to be stationed, subject matter to be documented, etc.

.01 Equipment

- Sony Digital Handycam
- Lithium batteries
- Sony Amateur Movie Light Source
- Mini DV videotapes
- Sony Cordless Microphone (transmitter and receiver)

.02 Procedure

- Obtain a verbal summary from requestor of scope of event prior to videotaping.
- Complete instructions for videotaping reenactments above.

SEARCH METHODS

The Crime Scene Section personnel are responsible for completing methodical and systematic searches of every crime scene to afford the greatest chances of locating all items of evidentiary value. A variety of crime scene search methods are available and will usually be determined by the location and circumstances at hand.

1 Lane Search

.01 This search method is typically used for ground level outdoor or larger indoor crime scenes (i.e. warehouses) when a team of searchers may be employed.

.02 The scene should be divided into narrow lanes, no more than an arm's length on either side of the searcher.

.03 The lanes may be marked, using stakes and twine, etc., to ensure that all areas of the scene are included in the search.

.04 Each searcher is assigned a dedicated lane and should not deviate course.

.05 All searchers should start at one end of the established lanes, and once each lane has been thoroughly searched, continue on to the next lane until the entire search has been completed.

.06 Any items located may be marked with a flag, for documentation and collection, and the search continued.

2 Grid Search

.01 As with the Lane Search, the Grid Search is typically used for ground level outdoor or larger indoor crime scenes – such as warehouses, where a team of searchers may be employed.

.02 This is the most thorough search method because each area is searched twice.

.03 The scene should be divided into narrow lanes, no more than an arm's length on either side of the searcher.

.04 The lanes may be marked, using stakes and twine, etc., to ensure that all areas of the scene are included in the search.

.05 Each searcher is assigned a dedicated lane and should not deviate from course.

.06 All searchers should start at one end of the established lanes, and once each lane has been thoroughly searched, a second search is then performed at right angles to the initial lanes that were searched.

.07 Any items located may be marked with a flag, for documentation and collection, and the search continued.

3 Zone Search

.01 The Zone Search is typically used for vehicles and partitioned indoor crime scenes when fewer searchers are available.

.02 The room or vehicle is divided into dedicated three dimensional zones or compartments.

.03 The zones can then be further subdivided, if necessary, to include storage compartments and furniture, etc.

.04 One zone is searched at a time.

4 Spiral Search

.01 The Spiral Search is typically used for ground level outdoor scenes when very limited personnel are available.

.02 This method should only be used to locate large evidentiary items (i.e. clothing articles, weapons) and is not recommended for indoor scenes.

.03 The searcher(s) should start at the center of the scene and follow a uniformed spiral path outward from the center until the perimeter of the scene is reached.

.04 Any items located may be marked with a flag, for documentation and collection, and the search continued.

SKETCHING

The Crime Scene Section is responsible for producing sketches of crime scenes when required. The sketches are used as another form of evidence documentation and provide accurate spatial relationship data for items depicted in photographs. The sketch is meant to complement other forms of documentation as well as serve to refresh the memory of investigator's. The sketch is also used in court proceedings to illustrate the testimony of witnesses and provide factual data for crime scene reconstruction.

1 Responsibilities

.01 Crime Scene employees will ensure that a rough sketch is completed at the scene, including all appropriate measurements, when requested or determined to be necessary. The assigned LIMS number will be included.

.02 Crime Scene employees will ensure that a finished sketch of the crime scene is later completed, when requested or determined to be necessary, using the rough sketch data. The rough and finished sketches will be scanned into the report.

.03 Crime Scene Supervisors are responsible for ensuring that a sketch of the crime scene is completed by employees when required or when requested and that a copy is forwarded to the investigating detective.

.04 Crime Scene Supervisors can request assistance from the investigating unit to have patrol personnel assist when the situation dictates that the scene is too expansive, limited staffing of Crime Scene personnel, and/or time constraints.

2 Methods for Recording Measurements

.01 Crime scene sketches should be planned in a systematic manner. The overall layout of the scene should be drawn as a framework for all reference measurements and careful attention should be given when establishing compass directions for each area or room.

.02 Obtain accurate measurements for the overall layout of the scene, including doors, windows, major pieces of furniture and uncommon ceiling heights.

.03 A crime scene sketch may be depicted in various methods:

- The "projection sketch" is drawn as seen from above and a "cross projection sketch" includes the walls and ceiling folded out to the same plane as the floor.
- A "perspective sketch" is a three dimensional drawing and a "schematic sketch" is useful in depicting a combination of events that have occurred.
- A "detailed sketch" may be used when illustrating a small area in detail and prior to the removal of evidence from immovable objects. A detailed sketch may also be used when illustrating the interior of vehicles.

.04 Measurements to each item of evidence must be taken from two fixed points.

.05 The two fixed measurements can be taken from:

- two corners of the same wall, in the case of the "triangulation" survey method
- at 90 degree angles from two walls that abut each other, in the case of the "rectangular coordinates" method
- from a "transecting base line" in which a base line is established down the center of the crime scene from two fixed points and distances are measured at right angles to the left and the right of the base line
- "Polar coordinates" may also be used in large outdoor scenes where there are limited fixed objects. A compass is used to obtain a directional degree for a prescribed distance to establish a fixed reference point. That point can then be used for additional measurements.

3 Rough Sketches

.01 The "rough sketch" is a quick and crude drawing of the crime scene and is not drawn to scale. The rough sketch is done entirely at the scene usually in pencil and without drafting tools. All measurements should be made with a steel tape measure or laser measuring device.

4 Finished Diagram

.01 The "finished diagram" will be completed in ink or with the aid of a computer aided program. It is prepared with the aid of drafting tools and templates and should be neat and presentable for admission as a courtroom exhibit. It is not drawn to "exact" scale and should be so indicated, but it should be as close to scale as possible. The finished sketch must reflect the same information contained within the rough sketch for it to be admissible in court.

5 Elements of a Sketch

.01 Every crime scene sketch must include:

- a compass direction, usually north – facing toward the top of the page
- a scale – "Drawn Not to Exact Scale" but typically ¼" = 1'
- a legend or key - used to identify the objects and reference points in sketch
- a title - must contain the following necessary data to authenticate the sketch:
- LIMS number and case number
- date measurements taken
- location of incident
- type of offense
- author's name with employee number

GENERAL EVIDENCE HANDLING

Crime Scene Section personnel are responsible for the proper collection, identification, packaging, preservation, storage and submittal of a variety of different types of evidence. In general, all items of evidence should be documented as found prior to collection or as received in the laboratory. However, documentation of evidence will be at the discretion of the analyst.

1 Collection

.01 Only those items of probative value or as directed by an investigating detective should be collected.

.02 All evidence should be collected and packaged in a manner that will preserve the item for future analysis and protect the item from contamination or damage.

.03 When multiple items of evidence are present, tent markers or placards may be placed in close proximity to mark each item of evidence or area of interest.

.04 Items desired to be collected by police as “safekeeping” should not be collected by Crime Scene Section personnel. These non-evidentiary items pose a risk for cross-contamination and a greater burden on already limited resources.

.05 The investigating detective should be contacted prior to any damage or destruction of private property which may result from an evidence collection method.

.06 A supervisor should be contacted prior to the damage or disassembly of an object – such as furniture, guns, vehicles, etc. in which damage or injury may be caused, to ensure that proper tools and skilled personnel are available and that other collection methods have been considered.

2 Packaging

.01 Evidence being transported from the scene to the laboratory must be packaged to ensure that all open ends are secured.

.02 If evidence from only one case is being transported in the crime scene vehicle, then the exterior of the package should include a brief description of the item, time of collection, and exact location of collection (not physical address). If multiple cases are being transported, the offense number or LIMS laboratory generated number (if known) should also be written on each package.

.03 If an item is wet or is not able to be marked on directly, a paper laundry tag will be attached to the item denoting the identifying information.

.04 Generally, items of evidence should be packaged separately.

.05 Avoid packaging items so tight that proper re-packaging is not possible.

.06 The following standard identification data should be noted on every sealed package and checked for correctness:
- LIMS number with item number
- Offense number
- Offense type (at the time of collection)
- Date collected
- Time of collection
- Location of collection
- Employee initials and employee number
- Department label (if any)
- Note: An adhesive label may be used for this purpose; however the label information must be affixed to the correct item packaging.

.07 A brief description of the item contained within the sealed package should be included on the package.

.08 An adhesive chain of custody will be completed for every package of evidence collected directly from the scene.

.09 All mistakes will be properly corrected with one line through and initialed and mistakes in general, even though corrected, will be kept to a minimum.

.10 The Versadex bar code label should be placed near the adhesive chain of custody form.

.11 All openings of the package will be sealed with frangible tape to establish integrity of the contents. The employee's initials, employee number and the date the package was sealed will be written across the seal. This includes the bottom of cardboard boxes, etc. The integrity tape should not obstruct any other information on the packaging – especially bar codes.

.12 Smaller (coin or 6" x 9") manila envelopes should not be used for any outer-most packaging of evidence items. It is acceptable to use these envelopes as an inner layer of packaging.

.13 Once packaging has been completed, the analyst must ensure that all unused supplies will be discarded or returned to the proper storage location.

3 Evidence Storage Prior to Submission

.01 Clean butcher paper will be used on tables and shelves under all evidence.

.02 Evidence that must be dried before analysis or storage will be placed in one of the drying rooms located in the laboratory.

- The rack/tables/rods will be cleaned with a cleaning agent before evidence is placed into a drying room.
- Evidence will be covered loosely with clean butcher paper and if the evidence remains in a bag, the bag should be loosely closed, to prevent contamination and or deleterious change.
- Basic case information should be placed on the dry erase board on the drying room door.
- When evidence is removed, the drying room rack/table/rod will be cleaned with a cleaning agent and the floor swept.
- Any wet evidence run-off onto the floor or walls (blood, biological, etc.) will be cleaned with a cleaning agent and or equipment.
- The cleaning equipment – such as the steamer and power washer, may be utilized to clean a drying room at any time.

.03 Evidence collected by the analyst will occasionally and unavoidably be infested with insects – usually maggots and flies. To reduce the risk of Laboratory and or Forensic Building infestation, the following precautions should be followed:

- For maggots and flies, affix at least one fly strip inside the drying room and one outside the drying room door. Other fly strips may be used in infested areas of the lab as needed. Every precaution should be taken to avoid the release of maggots and flies into the Laboratory area.
- An employee assigned to the lab should be notified of the possibility of insect infestation from evidence in the drying rooms and/or laboratory.
- Once the infested evidence is removed, the <u>entire</u> drying room, including racks, tables, rods, walls, door, ceiling, and floor must be washed down with the power washer and cleaning agent.
- Drain covers in the affected drying room(s) will be removed and cleaned out with bleach or cleaning agent and flushed out with water.
- Any other drying room(s) or lab area that becomes affected by evidence related insect infestation will be cleaned with cleaning agent or power washer.
- If fly/maggot/insect infestation has spread into the general laboratory area and/or the Forensic Building, a pest control service will be called.
- Once fly infestation is over, the fly strips will be removed and disposed of in a waste receptacle.

.04 The designated laboratory refrigerator/freezer will be utilized for items requiring temporary refrigeration pending submission to the Evidence Control Section.

- Refrigerated evidence information will be noted on a dry erase board.

.05 Items from the field determined to be of no evidentiary value - such as trash, food stuffs, residual liquids, etc., can be approved for disposal by a Crime Scene Supervisor. The disposal and approval will be documented in the case record.

PHYSICAL EVIDENCE PROCESSING

The individualization of latent print evidence is often crucial in solving a crime. A latent print results from the reproduction of friction ridges found on parts of the fingers, palms, and feet. These prints consist of a combination of different chemicals that originate from natural secretions, blood, or contaminants. Natural secretions mainly derive from the eccrine and sebaceous glands and contain known chemical components. Eccrine gland secretions from the fingers, palms, and feet are both organic and inorganic, but only organic materials are secreted from the sebaceous glands. Other contaminants found in print residue results from contact with different materials in the environment. Latent prints can be found on all types of surfaces. In general, surfaces can be characterized as porous, nonporous, or semi-porous. Understanding these characteristics will aid in processing an item for prints.

1 Safety

.01 All work in the Crime Scene Laboratory will be performed in accordance with the Division Safety Manual and Crime Scene Standard Operating Procedures.

.02 The City of Austin is not responsible for the actions of any personnel outside the Forensics Division of the Austin Police Department, using this guide with regard to the handling, use, or improper disposal of the chemicals listed.

2 Laboratory Maintenance

In order for the Crime Scene Laboratory to function in an efficient and organized manner, all analysts must assist with the following required laboratory functions:

.01 Any unpackaged/unsealed evidence brought into the Crime Scene Laboratory should be placed on clean butcher paper.

.02 Prior to using working solutions, the expiration date must be checked and if expired, disposed of in the proper waste receptacle.

.03 Should the working solution become expired or depleted, sufficient quantities will be prepared as soon as possible for general use.

- The preparer will ensure that the newly created solution is quality tested for reliability and documented in the Reagent Quality Control Log (CS-06).
- The preparer will ensure that the container is clearly labeled with the appropriate information in accordance with the Division Operations Manual.
- Customized Chemical Safety Labels may be printed from the Group Drive and is recommended.
- All labels should face forward when placed in a storage location in order that they may be easily read.

.04 Once processing has been completed, the analyst should ensure that the following actions have been performed regarding equipment use:

- All processing tables/areas are cleared and or cleaned;
- All residual chemicals are disposed of in the proper waste receptacle;
- Depleted chemical bottles are left inside the chemical vent hood with cap off to dry;
- All dishes/lab ware are removed from the chemical vent hood and cleaned in the lab sink (may be placed in the dishwasher);
- All unused lab supplies are discarded or returned to the proper storage location;
- All equipment is stored and or properly shut down (i.e. the FLS lamp will be allowed to cool before turning off).

3 Selection of Processes

.01 In addition to the type of surface, another determining factor in choosing the proper process is the residue of the latent prints, including perspiration, blood, oil or grease, and dust.

.02 The condition of the surface also contributes to determining the correct process or sequence of processes to be used. Such surface conditions may include dry, wet, dirty, sticky and or oily.

.03 In determining the sequence of processes to be used, the circumstances of the type of case and condition of the evidence to be processed should be taken into consideration.

.04 The processes to be used during the development of latent prints should always begin with the least destructive and progress to the most destructive. During processing, evidence will be treated with the utmost care and must be protected and preserved in such a way that any subsequent examinations by other laboratories will be ensured.

.05 Employees will not disassemble any firearm to be processed for latent prints without obtaining prior approval from a supervisor and/or the Ballistics Section. Disassembly includes removing handgrips, scopes, sights, chokes, silencers, etc. Disassembly does not include documentation and safety procedures involving firearms.

4 Proper Sequencing and Processing Techniques

.01 Adherence to correct processing techniques will increase the probability of developing quality latent prints. This will promote a greater likelihood to develop all latent prints on a surface and minimizes the chance of destroying latent prints.

.02 Surfaces on which latent prints are deposited can be divided into three general categories---porous, semi-porous, and nonporous. Listed below are the suggested sequential processes for these categories including some unique and or difficult surfaces.

.03 Depending on the circumstances, every suggested process within the sequence may not always be performed. This is left to the discretion of the analyst performing the processing.

5 Visual Examination

.01 Visually examine all surfaces for latent prints or any other possible trace evidence before using any latent print development technique. Ensure that the surface is well illuminated. Turn small articles or move and adjust light to change the angle of illumination. Some latent prints may be visible only by oblique lighting. Any useful latent prints detected must be photographed before proceeding with any development process. Some friction ridge prints found by this method may not be detected by any other means. Use extreme care when handling articles to avoid damaging other prints that may not yet be apparent.

6 Fluorescence

.01 Certain properties of perspiration, body oils, and or foreign substances contained in latent print residue fluoresce when exposed to a laser or a forensic light source. A filter is used to block the incidental light of the light source. No pretreatment of the specimen is required; therefore, no alteration of the specimen occurs.

- Use on all surfaces
  - Nondestructive to specimen and subsequent examinations
  - Detects prints on surfaces not suitable for powders or chemicals
  - Detects prints not developed by other techniques
- Procedures for conducting an examination
  - Conduct examination in a dark room
  - Aim beam of light at object
  - View object through an orange or other appropriate colored filter
  - Preserve latent prints by photography
  - Use fluorescence examination after application of the following chemicals:
    - CA Fluorescent dyes (Rhodamine 6G, Ardrox, MBD, or RAM)
    - Fluorescent powders
    - DFO (1,8-Diazafluoren-9-one)

7 Processing Specific Types of Surfaces

.01 Porous Surfaces

- Visual Examination
- Inherent fluorescence by Forensic Light Source (FLS)
- Iodine fuming
- DFO (1,8-Diazafluoren-9-one)
- Forensic Light Source (FLS)

- Ninhydrin
- Physical Developer

.02 Semi-Porous Surfaces
- Same as Nonporous Surfaces

.03 Nonporous Surfaces
- Visual Examination
- Inherent fluorescence by Forensic Light Source (FLS)
- Cyanoacrylate fuming (CA Fuming)
- CA dye stain (Rhodamine 6G; Ardrox, MBD, or RAM)
- Forensic Light Source (FLS)
- Powder (Contrasting to Surface)

.04 Bloodstained Specimens--Porous
- Visual Examination
- Inherent fluorescence by Forensic Light Source (FLS)
- DFO (1,8-Diazafluoren-9-one)
- Forensic Light Source (FLS)
- Ninhydrin
- Amido Black
- Physical Developer

.05 Light-colored Bloodstained Specimens--Nonporous
- Visual Examination
- Inherent fluorescence by Forensic Light Source (FLS)
- Leucocrystal Violet or Amido Black

.06 Dark-colored Bloodstained Specimens--Nonporous
- Visual Examination
- Inherent fluorescence by Forensic Light Source (FLS)
- Titanium Dioxide

.07 Cardboard
- Visual Examination
- Inherent fluorescence by Forensic Light Source (FLS)
- DFO (1,8-Diazafluoren-9-one)
- Forensic Light Source (FLS)
- Ninhydrin
- Silver Nitrate

.08 Rubber Gloves---Semi-porous
- Visual Examination
- Inherent fluorescence by Forensic Light Source (FLS)
- Cyanoacrylate (CA) Fuming

- CA dye stain (Rhodamine 6G, Ardrox, MBD, or RAM)
- Forensic Light Source
- Magnetic Powder
- Ninhydrin (Petroleum Ether Reagent)
- Deionized water rinse
- Physical Developer

.09 Tape---Non-Adhesive Side
- Visual Examination
- Inherent fluorescence by Forensic Light Source (FLS)
- Cyanoacrylate (CA) fuming:
  - When processing the non-adhesive side of tape, the integrity of the adhesive side should not be compromised by contact with CA dyes or other solvents. Acetate or some other substrate should be used to protect the adhesive side.
- CA dye stain (Rhodamine 6G, Ardrox, MBD, or RAM)
- Forensic Light Source (FLS)
- Powder (contrasting, magnetic, or fluorescent)

.10 Clear or Light-colored Tape---Adhesive Side
- Visual Examination
- Inherent fluorescence by Forensic Light Source (FLS)
- Gentian Violet and/or Sticky side powder

.11 Dark-colored Tape---Adhesive Side
- Visual Examination
- Inherent fluorescence by Forensic Light Source (FLS)
- Titanium Dioxide

.12 Wallpaper
- Visual Examination
- Inherent fluorescence by Forensic Light Source (FLS)
- Iodine Fuming
- Ninhydrin
- Silver Nitrate

.13 Photographs---Emulsion Side
- Visual Examination
- Inherent fluorescence by Forensic Light Source (FLS)
- Iodine Fuming
- Cyanoacrylate (CA) Fuming
- CA dye stain (Rhodamine 6G, Ardrox, MBD, or RAM)
- Forensic Light Source
- Powder (contrasting, magnetic, or fluorescent)

.14 Photographs---Paper side---Semi-Porous

- Visual Examination
- Inherent fluorescence by Forensic Light Source (FLS)
- Iodine Fuming
- DFO (1,8-Diazafluorene-9-one)
- Forensic Light Source (FLS)
- Ninhydrin
- Physical Developer

.15 Glossy Paper---Semi-Porous

- Visual Examination
- Inherent fluorescence by Forensic Light Source (FLS)
- Cyanoacrylate (CA) Fuming
- Magnetic Powder
- DFO (1,8-Diazafluoren-9-one)
- Forensic Light Source (FLS)
- Ninhydrin
- CA dye stain (Rhodamine 6G, Ardrox, MBD, or RAM)
- Forensic Light Source (FLS)
- Physical Developer

FRICTION RIDGE EVIDENCE

Crime Scene Section personnel are responsible for conducting a thorough search for evidence during crime scene investigations. One type of evidence that is searched for and recovered is latent print evidence. This type of evidence is typically difficult to see or see clearly and requires some type of processing to be documented and or collected.

1 Definitions

.01 A good working knowledge of proper friction ridge definitions is essential for every analyst to possess. These definitions, among others, are often requested during courtroom testimony and are certainly expected from an expert witness:

- "Latent" Fingerprints
  An accidental reproduction of the friction ridge skin left on surfaces or objects that are handled. The word latent means "hidden" but the prints can be translucent in nature and may be seen with or sometimes even without oblique lighting. Latent prints will typically require a development technique to make the print visible so that it may be preserved as evidence for examination.

- "Patent" Fingerprints
  A visible reproduction of the friction ridge skin deposited when the ridges are contaminated or covered with blood, ink, paint, dust, dirt, etc. The patent print normally does not require a development or enhancement technique in order to be seen. Patent prints must be documented through photography.

- "Plastic" Fingerprints
  A type of print in which the friction ridge skin has come into contact with a malleable substance, such as putty, wax, wet paint, etc. The substance retains a three-dimensional image of the print. Plastic prints should be photographed and casting materials used to recover and preserve the evidence.

2 Factors to Consider

.01 The number one priority is to prevent contamination. Protect all areas that may have been touched. Only the analyst responsible for collection and or processing should handle the evidence.

.02 A search for latent prints should be done in a systematic and methodical manner.

.03 A strong flashlight is one of the best pieces of equipment that can be used in a search for latent prints.

.04 Powders and chemicals may interfere with other forms of pending analysis. Therefore, they should be used after more fragile or biological evidence has been collected.

.05 It is common for latent print evidence not to be located at a crime scene or during the processing of items in a laboratory. The following non-conducive factors for this lack of evidence should be known by every analyst and should be explained, if requested, during courtroom testimony:

- Manner transferred – substrate not grasped with friction ridge skin or the pressure applied is too great or too light for proper transfer
- Surface condition – texture of substrate is too rough, or substrate is covered in dust or some other barrier such as moisture, etc.
- Weather – too cold for sweat to be produced or too hot, causing excessive sweat transfer to be deposited
- Physiological – barriers such as gloves, socks, etc., physical conditions of the friction ridge skin – dirty, deformed, injured, etc., or occupation(s) performed that injured the friction ridge skin such as brick layer, dish washer, etc.
- Removal – latent prints are intentionally removed or unintentionally removed from the substrate.
- Non-recognition – the evidence is not searched for or an inadequate search/latent print processing is conducted

3 Processing Procedures

.01 There are many processing procedures available to the analyst regarding the development and recovery of latent print evidence. Latent development processes are listed in Appendix B of this manual. The principle recovery methods utilized by the analyst will be through photography, lifting, and casting.

.02 A supervisor will be notified if a request is made for personnel to re-process an item previously processed by Crime Scene personnel. The supervisor will make the determination regarding what, if any, additional processing needs to be conducted.

4 Sample Selection

.01 On those substrates where potential friction ridge evidence is developed, only those impressions displaying clear detail will be recovered for submittal. This decision will be left to the discretion of the analyst.

5 Recovery Methods

.01 Photography Documentation

When photographs are taken of clearly detailed, friction ridge impressions, personnel will comply with the procedures outlined in the Photography chapter of this Technical Manual.

.02 Lifting Techniques

Clearly detailed friction ridge impressions, developed by the powdering process, may be photographed but should be recovered by lifting, if possible. There are various lifting tapes available to the analyst, to include fingerprint tape, polyethylene tape and gel tape.

- Procedure
  - Apply contrasting powder to the area of interest in a circular motion and concentrate on any areas of development. Do not over or under powder the developed impression.
  - Determine what size tape to use by viewing the area of development. Do not use regular household or office cellophane tape, but use tape that is made especially for lifting fingerprints.
  - Single fingers or small areas of friction ridge impression may be lifted with smaller size tapes, whereas, larger areas or multiple prints could require wider tapes.
  - Before a lift is made, attempt to remove any excess powder.
  - Maintain a continuous tab at the end of the tape roll after each lift.
  - When pulling the tape off the roll, it should be pulled in one continuous motion until the proper length is obtained. Stopping and starting the tape during removal may cause distortion.
  - Pre-printed latent cards and envelopes are provided for use by the Crime Scene Section and the entire Department. Complete information must be documented for each case.
- To obtain the lift:
  - Prepare a contrasting lift card to receive the tape;
  - Hold one end of the tape in each hand and firmly adhere one end of the tape to the substrate near the impression;
  - Slide a finger through the center of the tape from one end to the other and then press from the middle of the tape to the edge, attempting to eliminate any air bubbles;
  - Lift the tape (and the latent) off the substrate and adhere the tape to the blank or glossy side of the lift card in a similar manner.
- On the front of the lift card, note the position of the latent with a directional arrow in regard to the object from which the latent was lifted.
- Latent lifts from different locations will be placed on separate cards with a diagram of the approximate location of the latent included.
- Complete all the spaces on the back of the lift card. Fill in the date, case number, initials, description of item, a brief sketch, and any other information deemed necessary (e.g., the last four of VIN of vehicle processed).

- If the last four numbers of a vehicle identification number (VIN) is used on lift cards, the complete VIN must be noted in the report narrative.
- When completing the description portion of the latent card, only approved abbreviations will be used. Also the same exact wording should be used on multiple lifts from the same location.
- The latent lift should be examined for clear detail and if observed, the latent lift will be submitted as evidence. If not, it may be discarded.
- Latent print cards will be completed and sealed in a completed envelope.
- Approximately 25 latent lift cards may be placed in a latent envelope.
- The exact number of lift cards will be noted on the envelope and should be documented in the item description in the report.
- Some factors to keep in mind with a tape lift are the wider the tape, the harder it is to control, the tape tends to curl back on itself, and curved substrates may cause wrinkles in the lift.

.03 Casting Techniques

Plastic fingerprints such as those in soap, paint, putty, etc., pose a unique problem. These types of prints cannot be preserved by normal powder and lifting techniques. These prints are usually photographed using oblique lighting. However, because these prints are often concave, it is sometimes impossible to evenly distribute light over the entire area. Casting tends to solve the problem.

- Mikrosil
  - Procedure
    - Squeeze out equal lengths of Mikrosil and hardener and mix with wooden stick thoroughly (until color is consistent).
    - Apply Mikrosil mix directly on surface ensuring that the entire area in question has been covered.
    - Generally the mixture will take 5 to 15 minutes to set depending on the temperature.
    - After setting, peel off and mark for identification with a laundry tag as the cast cannot be written on directly.
    - Cast can then be packaged in a glassine envelope.
    - Cannot be used on soft substances such as grease, peanut butter, semi-dry paint.

- Accutrans (Polyvinylsiloxane)
  This casting material was developed to aid in the collection and documentation of both friction ridge detail on curved and or rough surfaces and tool impressions in metallic and or rigid surfaces.
  - Procedure
    - Place cartridge into gun and apply mixing tip.
    - Pull trigger gently to extrude material and mix through tip.
    - Apply even amount of material directly over impression.
    - Cover entire impression, gently smoothing if necessary.
    - Sets in 4 minutes at 68° F and 8 minutes at 50° F.

  - After impression is set, peel off and mark for identification.
  - Package for submission to the CEL.
- Use for tool impressions
  - Utilize brown cartridges primarily for tool impressions.
  - Not for use on tool impressions in wooden substrates.
  - Cannot be written on directly for identification; affix a laundry tag in a vacant corner of the cast.
  - Place in glassine envelope (with LIMS number and all identifying information).
  - Enter the tool impression cast into Versadex as a “Miscellaneous” Article Type and package for submission.
- Use for friction ridge impressions
  - Use transparent cartridge for visibility through the material.
  - To develop ridge detail, apply black or magnetic powder to area <u>before</u> applying material.
  - Cover entire impression and gently smooth before allowing to set. Irregular applications of transparent material (waves or bumps) will cause distortion.
  - Peel material off and affix <u>securely</u> to a latent lift card with polyvinyl tape (covering entire cast with tape).
  - Include an orientation arrow and identification information on the card – the same as a lifted impression.
  - If white (or any opaque) material is used, follow the same procedures as above but include the word “REVERSED” on the glossy side of the card.
  - Enter the latent impression cast(s) into Versadex as a “Latent Prints” Article Type and package for submission.
  - Approximately three cards with casts per latent print envelope should be submitted to the CEL.
- Limitations
  - Accutrans hardens quickly and as a result, the mixing tip is usable for only a few minutes once material is introduced.
  - Cannot be used on soft substances such as grease, peanut butter, semi-dry paint, etc.

TRACE EVIDENCE

Crime Scene Section personnel are responsible for collecting trace evidence, such as hair, fibers, glass, paint, soil and chemicals.

1 Hair and Fiber Evidence

.01 Equipment
- Hinge lifts
- Glassine envelopes
- Tweezers
- Razor blade/Scalpels
- Paper envelopes
- Forensic Light Source
- Trace Evidence Vacuum

.02 Examination Methods
- Visual inspection using flashlight with oblique lighting.
- Visual inspection using Forensic Light Source.

.03 Sample Selection of Unknown Standards
- On those substrates where trace evidence is observed, all unknown samples should be collected.
- Collection Methods

.04 Objects with hair/fiber firmly attached:
- Carefully collect the entire object, if possible, and package the object in such a way that the hair/fiber will not become dislodged.

.05 Objects with hair/fiber not firmly attached:
- Note location and photograph the hair/fiber in place (if possible)
- Carefully remove the hair/fiber using gloved fingers or tweezers
- Package hair/fiber inside a glassine envelope or paper bindle

.06 Large areas (e.g. vehicles/mattresses/bodies/floors):
- A visual search of the area should be completed first.
- Section off the area (e.g. driver's seat, passenger seat, shirt, pants), and use one hinge lift per area. Each hinge lift should then be properly marked immediately with identifying information.
- When practical, hinge lifts should be collected prior to disturbing the areas or transporting the body to the morgue.
- Package the hinge lifts from each area individually and in a fully sealed container.

- Filthy areas, such as floors or vehicle floorboards, should be vacuumed rather than hinge lifted as a final effort to collect any trace evidence undetected through other search methods.

.07 Sample Selection of Known Standards

- Collection personnel should always consider search and seizure statutes when collecting known standards and whether possible trace evidence (victim's hair, etc.) has been collected beforehand. Identification photo(s) of the subject should be obtained prior to collection and the subject's identifying information noted on the container immediately after collection. The following collection methods should be utilized:

- Head Hair
  - A representative sample of approximately 10 hairs from <u>each</u> area should be collected.
  - Much more may need to be collected for intended drug analysis.
  - The samples should be taken from the top left, top right, center, lower left, and lower right sides of the scalp.
  - The hair should be pulled as close to the root as possible without stretching the hair.
  - If head hair is too short to be pulled, it may be cut as closely to the scalp as possible (with proper notation).
  - Package inside glassine envelope or paper bindle.

- Pubic Hair
  - A representative sample of approximately 15-20 hairs total should be collected.
  - The hair should be pulled as close to the root as possible without stretching the hair.
  - Package inside glassine envelope or paper bindle.

- Other Body Hair Standards
  - A representative sample of approximately 20 hairs from the area should be collected.
  - The hair should be pulled as close to the root as possible without stretching the hair.
  - Package inside glassine envelope or paper bindle.

- Animal Hair Standards
  - A representative sample of approximately 50 hairs from the head, back, tail, and under belly area should be collected.
  - The hair should be pulled as close to the root as possible without stretching the hair.
  - Package inside glassine envelope or paper bindle.

- Carpet Fiber Standards
  - A representative sample of the carpet should be collected so that the fiber types/colors/wear are represented.
  - Include stained/unstained areas and faded/unfaded areas as well as areas which have different wear patterns and treatment.
  - The fibers should be cut as close to the backing as possible.
  - Package inside glassine envelope or paper bindle and properly mark with identification information.

- Clothing Fiber Standards
  - When possible, collect the entire item of clothing, handling carefully so as to not lose any fibers.
  - Package properly and mark with identification information.

.08 Laboratory Analysis
- Trace evidence analysis will be conducted by the Texas Department of Public Safety Laboratory.

2 Glass

Crime Scene Section personnel are responsible for collecting glass evidence which may be present in such cases as homicides, traffic investigations, and burglary investigations where windows, automobile glass, bottles, and other glass objects have been broken. Glass evidence can often assist in the reconstruction of crime scenes.

.01 Sample Selection
- On those substrates where glass evidence is observed, unknown samples should be collected at the discretion of the analyst.

.02 Collection Methods
- Objects with glass firmly attached:
  - Note the location and photograph the glass, if possible.
  - Carefully collect the entire object and package the object in such a way that the glass will not become dislodged.
  - Properly package and mark with information.
- Objects with glass not firmly attached:
  - Note the location and photograph the glass, if possible.
  - Carefully remove the glass using tweezers or gloved fingers.
  - Place inside a glassine envelope or paper bindle.
  - Properly package and mark with information.
- Clothing/Shoes (e.g., hit and run victim/suspect):
  - Glass evidence is usually microscopic.
  - Photograph the glass (if possible).
  - Wrap each individual item in paper (if possible).
  - Package in paper bag and mark with information.
- Glass Items (e.g., light bulbs, bottles)

    - Note the location and photograph the item, if possible.
    - Carefully remove the glass item using gloved fingers.
    - Properly package in a paper bag within a cardboard box.
- Known standards
    - For a comparison standard, collect as much as possible of the broken glass.
    - If glass is being used to determine the direction of impact, document which side was the outside.
    - Package separately from questioned samples.

3 Paint Evidence

Crime Scene Section personnel are responsible for the documentation and collection of paint evidence which may be present in such cases as homicides, traffic investigations, and burglary investigations.

.01 Sample Selection

- On those substrates where paint evidence is observed, unknown samples should be collected at the discretion of the analyst.

.02 Collection Methods

- Photograph the paint (if possible).
- Note the location.
- When possible, carefully collect the entire object and package in such a way that the paint will not become dislodged.
- When unable to collect the object, use a clean scalpel or knife blade to carefully scrape the paint sample into a glassine envelope or paper bindle.
- When collecting paint samples from vehicles, a sample from each area of damage should be obtained.
- The sample should include all layers down to the bare metal/wood.
- Samples from different areas should be collected and packaged separately.
- Clothing items/shoes (e.g. suspect/hit and run victim) with paint transfer should be wrapped in paper first, then placed in a paper bag.
- Known standards:
    - Obtain a known paint sample in close proximity to the unknown sample.
    - The sample should include all layers down to the bare metal/wood.
    - The sample should be collected and packaged in the same manner as previously mentioned.

4 Soil Evidence

Crime Scene Section personnel are responsible for collecting soil evidence which may be present in such cases as homicides, sexual assaults, and burglary investigations.

.01 Sample Selection

- On those substrates where soil evidence is observed, unknown samples should be collected at the discretion of the analyst.

.02 Collection Methods

- Soil from impressions:
  - Note the location and photograph the impressions.
  - Complete casting prior to collection.
  - Soil will adhere to the cast. This can be used as your sample. Do not attempt to clean the cast by removing the soil.
  - Air dry for 48 hours and ensure soil is dry.
  - Package to ensure cast will not be damaged and not in plastic.
- Clothing/Shoes:
  - Photograph the soil (if possible).
  - Wrap each item individually in paper (if possible).
  - Air dry and ensure soil is dry.
  - Package in paper bag.
- Unknown soil sample:
  - Note the location and photograph the soil sample.
  - Collect the sample in such a way that it will be allowed to air dry. A recommended method is a paper bindle that can be folded to secure the sample.
  - Once the sample is dry, it can be packaged.
- Known standards:
  - Photograph the soil and area (if possible).
  - Collect at least three tablespoons of soil from each area of interest or under and around where a victim body was located, etc.
  - Samples should be collected from the top one quarter inch of the surface soil and be representative of the soil types in the area.
  - The samples should be collected in such a way that they will be allowed to air dry. A recommended method is a paper bindle that can be folded to secure the sample.
  - Once the samples are dry, they can be packaged.

5 Chemical Evidence

Crime Scene Section personnel are responsible for collecting chemical trace evidence from a victim or crime scene, such as Ether or Chloroform, when it is thought that the chemical may evaporate when left open to the environment. This type of evidence may be present in such cases as homicides, suicides, sexual assaults, etc.

.01 Equipment

- Pint size metal cans
- Sterile gauze

.02 Examination Methods

- Visual inspection utilizing adequate light.

.03 Sample Selection

- On those substrates where volatile evidence is suspected, all unknown samples should be collected.

.04 Collection Methods

- Using PPE, wipe the entire surface area in question with sterile gauze pads as soon as possible.
- Place the sterile gauze pad(s) into a small (pint) size metal paint can and apply the airtight lid immediately. Mark the paint can with appropriate identifying information and package as normal.
- In the case of suspected Ether or Chloroform, it will be highly unlikely for a concentrated amount of residue to be present, if any at all, but collection should be attempted regardless. Sterile gauze pads (not swabs) should be used, in order to gather from the greatest amount of surface area.
- Glass tubes and plastic containers should not be used. If the application instrument (rag, etc.) is to be collected, it should be packaged similarly in a separate, appropriately sized, airtight container.

.05 Other Chemical Evidence

- If suspected drugs or poison, etc. are collected, the total amount (liquid or powder residue) present should be collected, including any container.
- Powder residues on surfaces should be swabbed, after moistening with 1:1 methanol to water solution (brought to the scene). A second swab sample, from the same nearby surface area, should be submitted as a control.
- Liquid samples should be collected in a wide mouth, sturdy plastic container (Nalgene) or left in the original product container.
- NEVER place suspected carbonated drinks (wine, soda, fruit juices) into metal cans (to help prevent a dangerous chemical reaction).
- Milk based liquids and natural fruit juices should be refrigerated prior to submission with a note to be placed in a freezer for extended storage.
- Samples should also be packaged in an outermost zip-lock type bag.

PRESUMPTIVE TESTING

Various chemical processes and presumptive tests are utilized in crime scene investigations to assist in the detection and development of potential evidence. These presumptive tests are useful in determining the possible presence of biological material, but may also produce a false positive reaction in the presence of various resembling substances. Should a positive reaction take place, the result only suggests the presence of biological material and that it may be worthy of collection. All reagents will be tested to ensure reliability prior to each use and documented in the case record – including the lot number of any reagent used. The phrase "presence of possible blood" may be reported when a successful presumptive test is conducted and a sample should be retained for further lab analysis.

1 Luminol

Luminol is utilized in the field as a presumptive test for the presence of blood. Catalytic tests for blood are based on the peroxidase-like activity exhibited by the heme group of hemoglobin. In the case of luminol, the catalytic oxidation of the substrate compound produces light. Because the reagents are applied as a spray over a large area, the test is primarily used in the visualization of bloodstain patterns. Since there are several oxidizing substances that will produce a false positive, a reaction only suggests the presence of blood, and should only be considered a presumptive test.

.01 Safety

- Luminol is an irritant. Sodium perborate tetrahydrate and sodium carbonate are both toxic and irritants.
- Avoid breathing sprayed solution; do not get in eyes, on skin, or on clothing. Gloves must be worn during testing and any exposed skin should be covered.

.02 Equipment / Materials / Reagents

- sodium carbonate 94 g
- 5-amino-2,3-dihydro-1,4-phthalazinedione free acid 1.8 g
- sodium perborate tetrahydrate 27 g
- deionized water (dIH_2O) 1 liter X 2
- spray bottle(s)
- Alternate method - 3% H_2O_2 or 30% H_2O_2

.03 Standards and Controls

- A positive control will be performed on the reagent before use to ensure its reliability. The reagent will be tested by successfully developing a known blood standard. Success is determined by the reagent producing a bluish chemiluminescent glow.

.04 Procedure

- Prepare the reagents. The prepared reagents are unstable and must be prepared fresh immediately before use. The components can be measured for transport to the crime scene for preparation prior to use. Reagents A and B can be stored separately at 4°C for up to 8 weeks. If stored, the label must include at a minimum, "Luminol, Reagent A" or "Luminol, Reagent B" as appropriate, initials, and the date prepared.

  - Standard Method
    - .1 Reagent A
      - Dissolve sodium carbonate (94 g) in dIH_2O (1 liter)
      - Add and dissolve Luminol (1.8 g)
    - .2 Reagent B
      - Dissolve sodium perborate tetrahydrate (27 g) in dIH_2O (1 liter)

  - Alternative Method
    - .1 Reagent A
      - Dissolve sodium carbonate (25 g) in dIH_2O (450 ml).
      - Add and dissolve luminol (0.5 g).
    - .2 Reagent B
      - 50 ml 3% H_2O_2 , or 5 ml 30% H_2O_2 added to 45 ml dIH_2O.

- Darken the examination room or crime scene area completely.
  - Apply the reagents:
    - .1 Mix equal volumes of Reagent A and Reagent B. This mixture is stable for about one hour.
    - .2 Spray mixed reagent.

  - Alternative Method:
    - .1 When ready to use, add Reagent B to Reagent A. This mixture is stable for about one hour.
    - .2 Spray mixed reagent.

.05 Interpretation

- Faint to strong luminescence shows oxidation of the luminol reagent and represents a positive presumptive result for blood.

.06 Preservation

- Areas of luminescence can be documented with photography.
- Re-spray area as necessary. The first spraying typically produces the most luminescence. The ability to further test the stain is lessened with increased or repeated spraying. Excessive spraying will cause stains to run. Repeated spraying of non-porous surfaces is not recommended.
- Document luminescence with photography:

- Refer to Photography – Photographing Luminol chapter in this Technical Manual.

.07 Storage
- Store dry chemicals separately and mix when needed.

.08 Shelf Life
- Approximately 1 hour after Reagent A and Reagent B have been mixed together.

.09 Disposal
- Unused portion of mixed chemical should be placed in a chemical waste bin for proper disposal.

.10 Clean-Up
- Ventilate area of leak or spill and wear appropriate personal protective equipment, when cleaning. Place waste in chemical waste bin for disposal.

.11 NFPA Code

Health 3 **Fire 1** **Reactivity 1**

2 Hemastix®

Hemastix®, a presumptive test for blood, is a commercially prepared plastic strip that contains a reagent test area at one end. The reagent is pale yellow in color and contains the chemical tetramethylbenzidine. Tetramethylbenzidine is used in a chemical reaction as a presumptive test for hemoglobin, a component of red blood cells. The test is very sensitive and is capable of detecting invisible quantities of red blood cells as well as very old bloodstains. Because this is a presumptive test, samples should be collected and forwarded for analysis if a positive reaction occurs.

.01 Equipment
- Bayer brand Hemastix®
- Deionized water

.02 Quality Control Procedure
- Before using Hemastix® test strips, a positive and negative control must be performed to ensure reliability of the strips inside the container. An appropriate positive control will utilize a known blood sample prepared in house and kept in the blood collection kit.
- A negative control is achieved by placing one drop of deionized water on the test strip and observing for 3-5 seconds. If no change in appearance is observed, the negative control is successful.
- A positive control will be conducted by transferring a portion of the known blood sample onto a test strip from the container to be used. The test strip

will turn a green\dark blue color within 3-5 seconds, indicating a successful positive control.

- The phrase "presence of possible blood" may be reported only when a successful presumptive test is conducted.

.03 Presumptive Test Procedures

- Personal protective equipment, including gloves and mask, will be worn at all times when coming into contact with suspected biological fluids and when handling the test strips.
- Prior to using the test strip, inspect the expiration date on the container to ensure the strips are current. Do not use if expired.
- Obtain one Hemastix® test strip and moisten the reagent pad with one drop of deionized water. Observe the strip to ensure that no reaction occurs. (Alternatively, a dry strip application may be used during this process.)
- Ensure the reagent pad does not become contaminated by coming into contact with other areas.
- Apply the reagent pad firmly to the smallest possible area, preferably on the perimeter, of the suspect stain.
- Observe the reagent pad for 3-5 seconds for any color change.
- A chemical reaction produces a color change ranging from green to dark blue depending on the quantity of the hemoglobin present. This color change indicates the presence of possible blood, which may then be collected.
- Ignore any color changes that produce too slowly (beyond 20 seconds).
- Discard all used test strips as bio-hazardous waste.

3 LCV (Leucocrystal Violet)

LCV is used at crime scenes and on evidence for the development and enhancement of blood evidence. The color reaction is from a light pink to a purple. LCV reacts with the enzymes present in blood.

.01 Control Procedures

- A positive control will be performed on the reagent before every application to ensure its reliability.
- The reagent will be tested by successfully developing a known blood standard. A successful control is light pink to purple reaction to the known blood standard.

.02 Processing Procedure

- Spraying is the most effective method of application.
- When spraying, use the finest mist possible because excess application may cause over development or running of the bloody print.
- Spray the specimen(s)--the development will occur within 30 seconds---then blot the area with a tissue or paper towel.
- When the area is dry, the preceding steps can be repeated to possibly improve contrast.

.03 Technical Notes

- When using LCV process in direct sunlight, any developed print should be photographed as soon as possible because ionization may occur, resulting in unwanted background development.
- LCV process may be used before Amido Black.
- On non-porous vertical surfaces, running of the blood print is more likely to occur.
- CA fuming may inhibit the LCV process.

.04 Preservation

- LCV developed evidence can only be preserved by photography.

.05 Storage

- LCV reagent must be stored in a dark brown bottle.
- LCV is mildly acidic and should be stored in the lab refrigerator to extend the shelf life.

.06 Shelf Life

- LCV dye in powder form---Indefinite.
- LCV mixed reagent---Up to 3 months

.07 Disposal

- Small amounts of powder LCV may be wrapped in paper and discarded in waste receptacle.
- Excess LCV mixed reagent in properly marked waste container.

.08 Clean-Up

- Soap and water for LCV stained areas.
- Use acid kit to clean up accidental spills.

.09 NFPA Code

Health 2 Fire 1Reactivity 1

4 Bluestar®

Catalytic tests for blood are based on the peroxidase-like activity exhibited by the heme group of hemoglobin. In the case of Bluestar®, the catalytic oxidation of the substrate compound produces light. Because the reagents are applied as a spray over a large area, the test is primarily used in the visualization of bloodstain patterns. The test is sensitive to up to 1/1000 dilutions of blood. Although false positive reactions might occur with certain household detergents and certain iron metabolizing plants.

.01 Safety

- Body fluids and extracts may contain infective agents, therefore universal precautions will be employed during biological evidence handling.

- Bluestar® is an irritant. Sodium perborate tetrahydrate and sodium carbonate are both toxic and irritants. Avoid breathing sprayed solution; do not get in eyes, on skin, or on clothing.
- Gloves must be worn during testing. Any exposed skin should be covered.

.02 Equipment / Materials / Reagents
- Bluestar® Forensic Tablets
- Deionized water

.03 Quality Control
- Before using Bluestar® in the field, a positive and negative control must be used to test the reagent. An appropriate positive control is a small blood sample prepared in house and kept in the blood collection kit.
- Positive control test will be conducted by transferring a portion of the known blood sample onto a cotton tip applicator and administering the prepared Bluestar® reagent. A negative control test will be conducted on an unused cotton tip applicator. A successful control is blue reaction to the known blood standard.

.04 Procedure
- Prepare the reagent by combining one pair of Bluestar® tablets to 125 ml of deionized water in a spray bottle. Screw the sprayer head on the bottle firmly. Allow 2 minutes for complete dissolution and mixing of the chemicals. Do not shake the container. Best results are obtained when the prepared reagent is used within 3 hours of mixing. The kit may be stored within the crime scene vehicles. The kit has a 3 year shelf life after manufacturing.
- Darken the examination room or crime scene area and apply the reagent.

.05 Interpretation
- Faint to strong luminescence shows oxidation of the Bluestar® reagent and represents a positive presumptive result for blood.

.06 Preservation
- Areas of luminescence can be documented with photography.
- Re-spray area as necessary. Excessive spraying will cause stains to run.
- Document luminescence with photography:
  - Refer to Photography – Photographing Bluestar chapter in this Technical Manual.

.07 Storage
- The tablets with be stored in the laboratory.

.08 Shelf Life
- The unmixed kit has a shelf life of 3 years. The mixed solution has a shelf life of approximately 3 hours.

.09 Disposal

- Unused portion of mixed chemical should be placed in a chemical waste bin for proper disposal.

.10 Clean-Up

- Ventilate area of leak or spill and wear appropriate personal protective equipment, when cleaning. Place waste in chemical waste bin disposal.

.11 NFPA Codes

Beige tablet:

Luminol:	**Health 2**	**Fire 1**	**Reactivity 0**
Sodium Hydroxide:	**Health 3**	**Fire 0**	**Reactivity 1**

White tablet:

Urea Hydrogen Peroxide:			
	Health 3	**Fire 1**	**Reactivity 0**

BIOLOGICAL EVIDENCE

The Crime Scene Section is responsible for the proper documentation, collection, and preservation of biological evidence, which may include blood, semen, saliva, perspiration, human tissue, teeth, urine, feces, and possible contact DNA. Several presumptive tests are available for suspected blood – such as Hemastix reagent strips. A presumptive test may be considered before collecting questioned stains of suspected blood.

1 Sample Selection

.01 On those substrates where biological evidence is observed or reasonably suspected – such as the lip area of a drinking container, samples should be collected. Several collection methods are outlined below. Whichever collection method is chosen, gloves will be changed between the collection or testing of DNA samples or as the gloves become contaminated.

2 General Collection

.01 Equipment

- Gloves, masks, lab coats, goggles
- Deionized water
- Packaging materials (paper bags, paper/glassine envelopes, tape)
- Sterile cotton swabs
- Hemastix
- Scalpels
- Specimen cups
- Swab boxes
- Pipettes
- Nail clippers/scrapers

.02 Suspected blood stains to be sampled should be photographed prior to collection. When samples are collected directly from subjects, identification photographs should be taken. After ensuring that all documentation of the biological evidence has been conducted, the following order of preference for collection should be performed:

- Collect the entire item on which the evidence is located, if possible:
  - Common sense should be used when determining whether the entire item should be collected.
  - If the item will not fit in the usual packaging containers, the area of concern (e.g., bloodstain on door) should be protected using paper to cover the area.
  - If the biological evidence is wet and is located on clothing items or bedding, those items may be placed in plastic for transport only. However any temporary packaging should be retained.
  - The items should then be secured in a drying room in the Crime Scene Laboratory until it is determined they are dry enough for submission.

    - These items should then be packaged in paper. A visual examination for residual trace evidence should be conducted on any paper used during the drying process if the paper is to be discarded.
- Cut the evidence from the item on which the evidence is located:
    - If the entire item cannot be collected, a representative sample will need to be removed from the substrate and retained.
    - The investigator should be aware of the removal of any samples in which damage will be caused.
    - This method may be used on envelopes, car seats, furniture, carpets, doors, window sills, etc.
    - Package the cut evidence in paper products such as paper bags and or glassine envelopes.
- Collect a sample of the evidence from the substrate on which the evidence is located:
    - If it is not practical to collect the entire item or cut a sample from the actual substrate, a swab sample of the evidence should be collected.
    - A sample will always consist of two swabs, as the quantity permits.
    - A presumptive test may be conducted on suspected blood stains, unless the stain is so minute that performing the test would not leave enough for analysis.
    - Sterile swabs should be moistened with approximately one drop of deionized water or less. Additional water may be added, if necessary. If the sample is still wet, additional water is not necessary.
    - Rotate the swabs through the sample until the swab appears saturated with the sample or until the sample appears depleted.
    - The swabs should then be placed in a biological evidence collection box (or swab box).
    - Swabs from the same sample should be packaged together.
    - The swab box should then be labeled immediately with the identifying information, to include from where the sample was derived.

3 Contact or Touch DNA

.01 There will be certain situations in which DNA may possibly be present on a substrate, but is not visible. These surfaces may be swabbed for possible DNA at the discretion of the analyst or if requested by an investigator. Visible stains are <u>not</u> considered contact or touch DNA and should be collected separately as stated in General Collection above.

.02 Firearms
All non-conducive surfaces (for latent print evidence) from one weapon (e.g., hand grips, trigger, trigger guard, slide serrations, safety, hammer, magazine release and base) should be sampled together and packaged as one item.

- Additionally, the muzzle may also be sampled at the discretion of the analyst for possible ‘blow back’ considerations.

- The head stamp areas of all unfired cartridges will be swabbed together and packaged as one item when removed from the weapon or when packaged together as received.
- Fired cartridge cases should not be sampled for contact DNA.

.03 Vehicle surfaces
All non-conducive surfaces for latent print evidence (e.g., steering wheel, gear shift, seatbelt latches, control knobs, interior door areas), from one seating area (e.g., driver, front passenger), should be swabbed together and packaged as one item.
- Exterior surfaces should be collected separately from interior surfaces.

.04 Other surfaces
Different surface locations (e.g., tool handles, door knobs, light switches) should be swabbed and packaged separately.

4 Collection from Individuals

.01 Crime Scene personnel are responsible for the collection and packaging of DNA reference samples (buccal) and clothing directly from individuals.
- Subjects should not be allowed to collect their own sample(s).
- A known reference sample (buccal swabs) should be requested from subjects when (unknown/questioned) evidence samples are collected <u>directly</u> from them (e.g. penile swabs, red brown stain on arm, swabbing of fingers).
- A known reference sample (buccal swabs) should be requested from subjects when their clothing is collected directly from them. This procedure is required by the DNA Laboratory should comparison(s) be conducted in the future.
- Requests for buccal swabs should be directed to the patrol officer/investigator responsible for the subject. The analyst will note whether consent is given or refused, or whether a search warrant was obtained.
  - Buccal swabs
    - .1 The analyst will use two sterile swabs to collect a DNA sample by rubbing the swabs on the interior cheek area of the subject's mouth.
    - .2 The swabs will be packaged inside a swab box, which should then be labeled immediately with the appropriate information, to include correctly spelled name and date of birth of the subject.
  - Penile swabs
    - .1 Penile swabs will be collected only when requested by an investigator. Penile swabs may be collected without a search warrant under exigent circumstances.
    - .2 Two sterile swabs moistened with deionized water will be used to collect penile swabs. Avoiding the urinary opening, the entire penis and scrotum area will be thoroughly swabbed.

.3 The swabs will be packaged inside a swab box, which should then be labeled immediately with the appropriate information, to include correctly spelled name and date of birth of the subject.

- Body swabs
  - .1 To collect potential evidence from other body parts, swabs will be collected when requested by an officer or investigator.
  - .2 Two sterile swabs moistened with deionized water will be used to swab the body part.
  - .3 The swabs will be packaged inside a swab box, which should then be labeled immediately with the appropriate information, to include correctly spelled name and date of birth of the subject.
- DNA Evidence Under Nails
  - .1 Evidence under the nails will be collected at the request of an investigator. Swabs should be collected as the preferred method prior to the collection of any clippings or scrapings.
  - .2 Two sterile swabs moistened with deionized water will be used to swab under the fingernails of each hand.
  - .3 The swabs from each hand will be packaged inside a separate swab box, which should then be labeled immediately with the appropriate information, to include correctly spelled name, date of birth, sex, and hand designation.
  - .4 A sterile pair of nail clippers will be utilized to clip the subject's nails into a glassine envelope or bindle if requested. The nail clippers should be packaged with the clippings.
  - .5 A sterile scraping device will be used to scrape under the subject's nails if requested. The device should be placed in with the scrapings.
  - .6 The clippings/scrapings from each hand will be packaged inside a separate glassine envelope, which should then be labeled immediately with the appropriate information, to include correctly spelled name, date of birth and hand designation.
  - .7 Although collected separately, the clippings/scrapings from each hand may be packaged within the same outermost package.

5 Specific Collection and Packaging

.01 Semen

- A dried or small sample should be swabbed and stored at room temperature.
- A pipette and specimen cup should be used to collect any large wet sample.
  - A collected wet sample and or an apparently used condom should be placed in a specimen cup and refrigerated as soon as possible. If unable to submit the evidence directly to the Evidence Control Section, it will be secured in Crime Scene Laboratory refrigerator until such time as it can be transferred to the Evidence Control Section.
  - The wet sample/used condom should be submitted to the Evidence Control Section with a special request that it be stored frozen.

.02 Urine

- Suspected urine will only be collected at the request of the investigator.
- Urine suspended in toilet water will be of very limited value and should normally not be collected.
- Collect a representative sample of the urine in a specimen cup and refrigerate as soon as possible. If unable to submit the evidence to the Evidence Control Section, secure it in the Crime Scene Laboratory refrigerator until such time as it can be transferred to the Evidence Control Section.
  - The urine sample should be submitted to the Evidence Control Section with a special request that the evidence be stored frozen.

.03 Feces

- Suspected feces will only be collected at the request of the investigator.
- Feces will be of very limited value and should normally not be collected. A private laboratory will conduct any examination that may be requested.
- Collect a small representative sample of the feces in a specimen cup and refrigerate as soon as possible. If unable to submit the evidence to the Evidence Control Section, secure it in the Crime Scene Laboratory refrigerator until such time as it can be transferred to the Evidence Control Section.
  - The fecal sample should be submitted to the Evidence Control Section with a special request that the evidence be stored frozen.

.04 Vomit

- Suspected vomit will only be collected at the request of the investigator.
- Collect a representative sample of the vomit in a specimen cup and refrigerate as soon as possible. If unable to submit the evidence to the Evidence Control Section, secure it in the Crime Scene Laboratory refrigerator until such time as it can be transferred to the Evidence Control Section.
  - The vomit sample should be submitted to the Evidence Control Section with a special request that the evidence be stored frozen.

.05 Bone, tissue, or teeth

- The Medical Examiner's Office will be notified of any scene involving human remains or suspected human remains as evidence and should normally not be collected.
- When not initially collected by the Medical Examiner's Office, evidence consisting of bone, tissue, or teeth should be refrigerated until such time as it may be submitted to the Evidence Control Section.
  - The sample should be submitted to the Evidence Control Section with a special request that the evidence be stored frozen.
  - Exemplar samples (e.g. femur, teeth) collected from the Medical Examiner's Office for identification purposes should be refrigerated until such time as it may be submitted to the Evidence Control Section with a request that the evidence be frozen during extended storage.

.06 Other miscellaneous items:

- Cigarette butts
  - The last half of the butt or filter (in contact with the mouth) should be retained and stored at room temperature for direct DNA analysis.
  - The remainder of the butt or filter should be retained for latent fingerprint processing.
- Chewed gum
  - Should be collected in a specimen cup.
  - The sample should be submitted to the Evidence Control Section with a special request that the evidence be stored frozen.
- Lip areas of drinking containers
  - Exterior surface of bottle caps should be swabbed separately from the interior surface.
- Various food items
  - Food items should normally not be collected. However, teeth impressions and or possible DNA may exist but will only be collected at the request of the investigator.
  - The sample should be submitted to the Evidence Control Section with a special request that the evidence be stored frozen.
- Contaminated items from decomposition
  - Those materials contaminated with decomposition fluid and infested with insect activity should be swabbed for possible DNA <u>prior</u> to packaging.
  - Swab samples for possible DNA should be collected before any further decomposition can occur or decomposition fluid may be transferred to other parts of the evidence during packaging and transport.
  - The swab samples should be from pertinent areas that are not saturated with decomposition fluid. Those areas saturated with decomposition fluid are not likely to yield useable DNA results.

6 DNA Laboratory Requests

.01 Occasionally, the analyst will be requested to collect possible DNA evidence from evidentiary items before latent print processing is conducted. These procedures have been established to successfully fulfill those requests.

- A Crime Scene Supervisor will approve those requests requiring DNA samples be collected and the approval will be noted in the lab case file.
- The analyst will obtain DNA samples from each requested item in accordance with their training (clean workbench, fresh paper, etc.). In addition to a lab coat and gloves, a mask must be worn at all times while performing DNA evidence collection duties. Other employees must not handle or be near the evidence without donning the same protective equipment.
- For clarity of source, all samples must be labeled with the LIMS item number of the original item, both on the packaging and in the LIMS description field (e.g. “swabs from handgrips of Glock pistol – Lab Item #14).

- Detailed bench notes must be maintained during the analysis, especially concerning the specific location on the originating item from which the sample was obtained. Photographs of the item(s) may be taken if additional documentation is desired.
- Each collected sample will be packaged and sealed independently.

.02 The analyst will add each of the collected sample(s) to both record management systems (Versadex and LIMS) in accordance with their training. The collected sample(s) will be submitted to the Evidence Control Section upon conclusion, unless otherwise directed.

- Collected sample(s) will be created in Versadex and linked to LIMS.
- Versadex and LIMS numbers will not be altered by Crime Scene personnel for any reason.
- Only the analyst who collected/entered the evidence may alter the item description under the Items tab.

.03 The analyst will include the DNA evidence descriptions and collection information in the final report, along with other expected item descriptions, latent print processing results, etc.

- The DNA information should be presented in proper chronological order within the body of the final report.

BLOOD STAIN ANALYSIS

In the natural course of processing crime scenes, bloodstain pattern analysis (BPA) can provide valuable investigative information. This includes, but is not limited to, validating statements of victims, witnesses, or suspects; determining the possible location and orientation of persons or objects at the time of bloodshed; determining the movement of persons or objects during or following bloodshed; potentially determining the number of blows, shots, or events which took place; and determining whether the suspect was injured.

These protocols provide general procedures for bloodstain pattern documentation and analysis. The protocols are not meant to be all-inclusive, and the bloodstain analyst(s) must use their training as well as the specifics of the case to determine the most appropriate procedure.

1 Limitations

.01 A number of factors and circumstances affect BPA and may limit the value of BPA or affect the analyst's ability to make certain conclusions. These factors may include, but are not limited to:

- Quantity and quality of bloodstains present
- Quality of bloodstain documentation from the scene
- Environmental factors
- Limiting factors on measurements and calculations
- Nature of the injuries or wounds
- Effect of first responders on the scene and other evidence

2 Procedure

.01 When documenting bloodstain evidence at a scene, specific documentation of the bloodstains must be obtained, beyond general crime scene documentation. Bloodstain pattern documentation should focus on the size, shape, distribution, and appearance, of bloodstains present. This includes documenting apparent directionality or movement, physical changes to bloodstains (i.e., dilution, flaking, or serum separation), the range in stain sizes, and the relationships between stains and their environment.

3 Documentation of Stains and Patterns

.01 Notes

- Notes should answer the questions of what, where, when and how concerning stains and patterns. They should also include information about who conducted the documentation. For example, when describing a stain, "what" might include the color, size, shape, and/or distribution of a stain or pattern in addition to an identification reference (e.g., stain "A"). "Where" would include measurements that may be incorporated in a sketch(es).

- Good notes are accurate, comprehensive, clear, concise and contemporaneous.
- Notes are an essential part of the documentation along with the photographs and sketches.

.02 Sketching

- A drawing or multiple drawings should be created to establish the general pattern area with attention to each specific pattern area.
- Sketches may include measurements and placements of all bloodstain patterns.
- The designated pattern area descriptions should be included.

.03 Photography

- Use camera settings that will provide high resolution.
- Capture images in color.
- Cameras may be mounted on a tripod to help ensure exact focusing and to make sure the camera is parallel to the stained surface.
- Orientation photos should show the relationship of the stained area with other recognizable features.
- Additional distribution photos may be taken with sizing scales. These establish the height and horizontal spread of the stain pattern.
- Close-up photos should include a scale to show stain shape and relative size.

4 Overview

.01 Analysis and interpretation of bloodstains at a scene or on evidence can only be performed by an analyst fully trained and competency tested in BPA. Analysis and interpretation of bloodstains involves classifying patterns present, identifying possible mechanisms, and applying these conclusions to the case.

.02 Analysis and interpretation of bloodstains requires a multi-step process. Individual steps are detailed below. It should not be assumed that each case will require all steps. Specifics of the case, as well as the training and experience of the analyst will determine which steps will be necessary for the analysis and interpretation.

5 Additional Case Information

.01 The BPA analyst must gather as much information as possible about the scene, statements of individuals from the scene, the nature of the wounds, and the results of additional forensic testing. All of this information will be used to classify patterns present and to develop and test theories regarding the nature of bloodstains present at a scene.

There is case information that may benefit the study of the bloodstains at a crime scene. This information should be sought and includes, but is not limited to:

- Police reports
- Medical reports
- Autopsy reports
- Crime scene reports
- Crime scene photographs, video, and diagrams
- Victim, suspect, and witness statements
- Crime lab reports

6 Presumptive Testing

.01 Presumptive tests for bloodstains may be performed at any time, whether at the scene or at the laboratory, as determined appropriate by the bloodstain pattern analyst.

7 Biological Material Encountered in an Examination

.01 Any biological material encountered in a bloodstain examination may be collected by the analyst. Biological material should be treated as directed in Division Safety Manual and this Technical Manual.

8 Analysis of Evidentiary Items

.01 If bloodstain items were collected while processing the scene, these items may be examined to document and identify the bloodstains. Examples of items which are often seized and examined at a later time include clothing, bedding, and weapons.

.02 When examining items submitted to the lab, the analyst should be aware of additional exam requests (i.e., biology, latent prints, and trace) and take the necessary precautions to preserve this evidence.

.03 Any bloodstains present should be documented in case notes, photographs, and sketches.

9 Pattern Classification

.01 The analyst should attempt to classify individual patterns present at the scene or on evidence. The ability to classify bloodstain patterns is dependent upon the amount and nature of bloodstains present. It may not be possible to classify every bloodstain pattern present at the scene. The analyst must consider all possible mechanisms capable of creating bloodstains present. Often, the size of bloodstains in various patterns overlap one another and it may not be possible to exclude one or more pattern classifications (i.e., impact verses expiration). In these cases, all possible options must be included.

10 Calculations

.01 Analysis of bloodstain patterns may require calculations when attempting to determine the area of origin for an impact pattern. Whether applying the tangent method or the string method to the analysis, these calculations may be used in the process:

- Identify individual stains within an impact pattern which have an appropriate elliptical shape. When possible, select stains across the entire width of the pattern. The analyst should take care to avoid stains which have been affected by gravity because these stains will raise the area of convergence higher than the true area of the impact.
- Measure and record the widths and lengths of each selected stain using a magnifying loupe or calipers equipped with a micrometer with divisions at least every 0.1 mm. The width should be measured at the widest point of the stain. The length of the stain must be estimated since wave cast-off actions will stretch the tail of a stain beyond the true ellipse.
- Calculate the angle of impact of each stain using the following formula:

$$\textbf{angle of impact } (\theta) = \arcsin(\text{width/length})$$

- Draw or string a straight line along the long axis of each stain going past the expected area of convergence. Once this has been done for all stains, select a point within the general area of convergence.
- Measure and record the distance of each stain from the point selected in the previous step.
- Using the calculated angle of impact (θ) and the distance from the area of convergence (d), the following calculation can be applied to each stain to determine the area of origin:

$$\textbf{distance from surface} = d \cdot \tan \theta$$

- The distance away from the surface should be reported as a range rather than as a single point.

11 Experimentation

.01 Experimentation allows the bloodstain pattern analyst to recreate mechanisms known or suspected to have occurred at a scene in order to determine what bloodstain patterns, if any, these mechanisms can create. Experimentation allows a thorough evaluation of these mechanisms in a controlled environment.

.02 When performing bloodstain experimentation, it is vital that the analyst prepare a scientifically sound experimental design. The experiment should be designed in a manner to mirror the mechanisms at the scene as closely as possible. This includes obtaining similar weapons, ammunition, clothing, carpet, etc. The design of the experiments, as well as the resultant bloodstains, should be

thoroughly documented through written descriptions, sketches, diagrams, and photographs.

.03 The goal of experimentation is to reproduce as much as possible bloodstains present at the scene as well as on submitted evidence. Analysts should consider all possibilities and may need to perform a number of experiments to include or exclude specific mechanisms.

.04 The Bloodstain Reconstruction Room is to be utilized for bloodstain pattern reconstruction and training in that discipline. Safety procedures must be followed when utilizing this room. The room should be decontaminated after each use. No evidence will be placed in this room without direct approval of a supervisor.

12 Interpretation and Reconstruction

.01 In addition to classifying bloodstain patterns and identifying mechanisms, it may be possible to apply these conclusions to the context of the scene and events which may or may not have taken place. The ability to make statements regarding interpretation and reconstruction depends entirely on the quality and amount of bloodstains present at the scene and the documentation of these bloodstains.

.02 Examples of interpretation and reconstruction statements include, but are not limited to, the following:

- Possible location and orientation of persons and/or objects at the time of bloodshed
- The movement of persons and/or objects during or following bloodshed
- The area(s) of origin of bloodshed
- Possibly the type of weapon used
- Potentially the number of blows, shots, or events, which took place
- Location of a victim when inflicted with a bleeding injury

.03 Extreme care should be taken when developing interpretation and reconstruction statements from the bloodstain pattern evidence. The analyst cannot go beyond what the evidence allows. At times, no conclusions may be possible from the bloodstain evidence. The analyst should always be guided by his or her training and experience when making these determinations.

13 Report Generation

.01 Reports will be issued in accordance with laboratory policies regarding reporting. If crime scene photographs are included in the body of the report, the unique digital image identification number must be referenced along with the photograph.

14 Terminology

.01 The terminology used in the process of bloodstain analysis may include, but is not limited to, the accepted list of terms and definitions as recommended by the *Scientific Working Group on Bloodstain Pattern Analysis (SWGSTAIN).* These terms and definitions commonly used are identified as follows:

- Accompanying Drop - A small blood drop produced as a by-product of drop formation.
- Altered Stain - A bloodstain with characteristics that indicate a physical change has occurred.
- Angle of Impact - The acute angle (alpha), relative to the plane of a target, at which a blood drop strikes the target.
- Area of Convergence - The area containing the intersections generated by lines drawn through the long axes of individual stains that indicates in two dimensions the location of the blood source.
- Area of Origin - The three-dimensional location from which spatter originated.
- Backspatter Pattern - A bloodstain pattern resulting from blood drops that traveled in the opposite direction of the external force applied; associated with an entrance wound created by a projectile.
- Blood clot - A gelatinous mass formed by a complex mechanism involving red blood cells, fibrinogen, platelets, and other clotting factors.
- Bloodstain - A deposit of blood on a surface.
- Bloodstain pattern - A grouping or distribution of bloodstains that indicates through regular or repetitive form, order, or arrangement the manner in which the pattern was deposited.
- Bubble Ring - An outline within a bloodstain resulting from air in the blood.
- Cast-off Pattern - A bloodstain pattern resulting from blood drops released from an object due to its motion.
- Cessation Cast-off Pattern - A bloodstain pattern resulting from blood drops released from an object due to its rapid deceleration.
- Directionality - The characteristic of a bloodstain that indicates the direction blood was moving at the time of deposition.
- Directional Angle - The angle (gamma) between the long axis of a spatter stain and a defined reference line on the target.
- Drip Pattern - A bloodstain pattern resulting from a liquid that dripped into another liquid, at least one of which was blood.
- Drip Stain - A bloodstain resulting from a falling drop that formed due to gravity.
- Drip Trail - A bloodstain pattern resulting from the movement of a source of drip stains between two points.
- Edge Characteristic - A physical feature of the periphery of a bloodstain.
- Expiration Pattern - A bloodstain pattern resulting from blood forced by airflow out of the nose, mouth, or a wound.
- Flow Pattern - A bloodstain pattern resulting from the movement of a volume of blood on a surface due to gravity or movement of the target.

- Forward Spatter Pattern - A bloodstain pattern resulting from blood drops that traveled in the same direction as the impact force.
- Impact Pattern - A bloodstain pattern resulting from an object striking liquid blood.
- Insect Stain - A bloodstain resulting from insect activity.
- Mist Pattern - A bloodstain pattern resulting from blood reduced to a spray of micro-drops as a result of the force applied.
- Parent Stain - A bloodstain from which a satellite stain originated.
- Perimeter Stain - An altered stain that consists of the peripheral characteristics of the original stain.
- Pool - A bloodstain resulting from an accumulation of liquid blood on a surface.
- Projected Pattern - bloodstain pattern resulting from the ejection of a volume of blood under pressure.
- Satellite Stain - A smaller bloodstain that originated during the formation of the parent stain as a result of blood impacting a surface.
- Saturation Stain - A bloodstain resulting from the accumulation of liquid blood in an absorbent material.
- Serum Stain - The stain resulting from the liquid portion of blood (serum) that separates during coagulation.
- Spatter Stain - A bloodstain resulting from a blood drop dispersed through the air due to an external force applied to a source of liquid blood.
- Splash Pattern - A bloodstain pattern resulting from a volume of liquid blood that falls or spills onto a surface.
- Swipe Pattern - A bloodstain pattern resulting from the transfer of blood from a blood-bearing surface onto another surface, with characteristics that indicate relative motion between the two surfaces.
- Target - A surface onto which blood has been deposited.
- Transfer Stain - A bloodstain resulting from contact between a blood-bearing surface and another surface.
- Void - An absence of blood in an otherwise continuous bloodstain or bloodstain pattern.
- Wipe Pattern - An altered bloodstain pattern resulting from an object moving through a preexisting wet bloodstain.

IMPRESSION EVIDENCE

Crime Scene Section personnel are responsible for documenting and collecting impression evidence such as footwear impressions, tool marks, and tire tread impressions. This evidence is commonly present in such cases as homicides, traffic, and burglary investigations. Impression evidence can be a three dimensional impression made in a malleable surface by an object or residue deposited on a solid surface in the form of a transfer.

1 Residue impressions

.01 Sample Section

- On those substrates where impression evidence is observed, unknown samples should be collected at the discretion of the analyst.

.02 Collection Methods

- Ensure the impression has been photographed according to the guidelines described in the Photography Chapter of this Technical Manual.
- If possible collect the object with the impression.
- If the residue is composed of dust, the use of an electrostatic dust lifter can be used. Refer to the Electrostatic Dust Lift Chapter in this Technical Manual.
- It is not recommended to use fingerprint powder to enhance a dust impression because it will likely destroy the impression, however, black powder may be used and lifted with Kinderprint for other residue impressions not composed of dust.

2 Indented Impressions (footwear and tire tread)

.01 Sample Section

- On those substrates where impression evidence is observed, unknown samples should be collected at the discretion of the analyst.

.02 Collection Methods

- Ensure the impression has been photographed according to the guidelines described in the Photography Chapter of this Technical Manual.
- Examine the impression for sticks, stones, and leaves loose on the surface. Gently remove these objects if doing so will not damage the impression.
- Do not attempt to remove any materials that are embedded into the impression.
- A metal frame may be placed surrounding the impression to prevent the dental stone mixture from running.
- The dental stone should be mixed with water in a zip lock bag or plastic container. The mixture should be a pancake batter-like consistency with minimal to no lumps.

- Once the mixture is complete, slowly pour the mixture starting just outside the higher end of the impression. The impression should be thick enough to prevent breakage when lifted.
- Allow the cast to air dry.
- The cast should be marked with the appropriate identifiers, including the LIMS number (if known), case number, date, offense title, location, employee name and number, item number and directional orientation.
- After it is determined that the cast is completely dry, gently remove the cast. Do not attempt to clean the cast off.

3 Sample Selection of Known Standards

. 01 Tire impressions

- When possible test impressions should be obtained in a controlled environment, with at least two people.
- The impression procedure should be conducted on a clean, smooth, hard surface.
- The impressions should be obtained with the tires still mounted on the vehicle, as soon as possible after the crime, in order to obtain an accurate impression.
- White sheets of paper, long enough to capture the entire circumference of the tire, should be placed under the tire. One known tire sample should be conducted at a time.
- The following information should be written on the paper:
  - Standard case information
  - Description of which tire (e.g. right front)
  - An arrow designating the direction the tire was rolled
- Several processes can be used to obtain the known impression. The following is a list of available methods:
  - Apply fingerprint powder to the surface of the tire, then roll the tire onto the paper.
  - Apply inked roller to the surface of the tire, rolling the tire onto the paper.
  - Apply silicon spray lightly to the surface of the tire, then roll the tire onto the paper. Apply fingerprint powder to the paper.
  - Impressions of all four tires should be taken unless otherwise directed by an investigator. The impressions may be packaged in a cardboard tube.

.02 Shoe impressions

- A scaled photograph of the soles of the shoes should be completed.
- If a physical impression is requested, fingerprint powder and Kinderprint paper will be utilized to obtain the impressions.
- The Kinderprint paper will be labeled with the appropriate case information including the name of the individual wearing the shoes, and which shoe the impression came from.
- If possible, the shoes should be collected for direct analysis.

FIREARMS EVIDENCE

Crime Scene (CS) Section personnel are responsible for documenting and collecting firearms evidence, which are commonly located at homicide, suicide, and aggravated assault scenes, etc. Firearms evidence should always be photographed according to the guidelines described in the Photography chapter of this Technical Manual.

1 Documentation

.01 Firearms Evidence collected directly from police:

- Obtain the following information:
  - Name and employee number of person presenting the firearm.
  - Full description of the weapon (e.g., make, model, serial number, action – if known, grips, etc.)
  - Describe the condition of the firearm at the time presented.
  - Do not include measurements in your descriptions, unless it is denoted (stamped) directly on the weapon.
  - Obtain or initiate a chain of custody from the officer/detective.
  - The officer/detective is responsible for documenting any location and condition information of the firearm prior to collection by CS personnel.

.02 Firearms Evidence collected from a scene:

- Document the description, position and condition of the firearm, which may include the following:
  - Location
  - Make/model/caliber/serial number (if known)
  - Action, grips, etc.
  - Position of the firearm (e.g., right side with barrel pointing north)
  - Position of the hammer
  - Magazine in or out
  - Safety on or off
  - Number, position and type of cartridges inside firearm
- Measurements will not be included in the descriptions, unless it is denoted (stamped) directly on the weapon.
- Use observations in the descriptions, such as - the barrel appeared to be modified, shortened, or an apparent modification to the barrel was observed, etc.
- Slang phrases or generally accepted terminology, such as “sawed-off”, may be included in the description, but only within quotation marks.
- It is acceptable to use the term *obliterated* or *partially obliterated* for any damaged serial numbers with visible abrasions rendering them unreadable.
- Firearms identified for “safekeeping” will not be collected by Crime Scene personnel unless directed to do so by a Crime Scene Supervisor.

2 Collection

.01 Safety

- All Crime Scene Section personnel are required to attend Firearms Safety Training.
- Every firearm should be treated as if it were loaded.
- If a Crime Scene Section employee is not familiar with a firearm, they will solicit assistance from someone who is familiar or contact a supervisor.
- Extreme care should also be used while unloading to ensure any possible trace evidence or fingerprints are not destroyed.
- During latent print processing, powder(s) should be kept from entering the barrel and away from the cylinders (in order to observe flaring) by placing tape and or rubber stoppers over the openings.
- Firearms and evidence related to the firearm should be processed for possible DNA and latent prints directly after collection and prior to submission.
  - An analysis request from an investigating detective will not be necessary.
  - This will apply to only those weapon related items that would be examined by the Ballistics Section.
  - Those firearms related to a homicide, suicide, safekeeping or officer involved incident will be processed only after request and or approval is received.
- **Requirements for unloading pistols:**
  - Point the firearm down or in a safe direction.
  - Keep finger away from the trigger.
  - Remove the magazine.
  - Pull slide back to eject any additional ammunition.
  - Remove the ammunition from the magazine (this can be done at the scene or in the laboratory). The type and number of ammunition should be documented.
  - Place the firearm and ammunition in a protective package.
- A photograph of the firearm and the magazine next to it may be taken. An additional photograph of the sequence of the ammunition inside of the magazine, once removed, may also be taken. Photographs of any trace evidence or bloodstains on the firearm should also be taken.
- **Requirements for unloading revolvers:**
  - Point the firearm down or in a safe direction.
  - Keep finger away from the trigger.
  - The exact position of the cylinder will be documented by marking (indexing) the cylinder on both sides of the top strap of the frame.
  - Open the cylinder and document (in your notes and with a sketch) the location, type, and number of each cartridge.
  - Carefully remove each cartridge or fired cartridge case.

- The ammunition under the hammer (between index marks) should be collected separately.

3 Preservation

.01 Firearms found in water should be placed in a container with the same water to prevent rusting.
- PVC containers and metal paint cans are available for transport.
- The Crime Scene Supervisor and the Firearms Examiner should be notified as soon as possible.
- If a firearm is exposed to water (e.g., rain) it should be brought to the Firearms Examiner's attention as soon as possible.

.02 Marking of firearm evidence
- Firearms should have a stamped identifying serial number present.
- If marking is desired, firearms should be marked in an inconspicuous location that does not interfere with any identifying stamps.
- Live cartridges may be marked on the side with a marker.

.03 Packaging of Firearm Evidence
Firearms will <u>never</u> be packaged loaded.
- Firearm evidence containing any type of biological fluids must be packaged in paper. All other firearms should be packaged in plastic.
- A biohazard sticker should be placed on the package, if necessary.
- A firearm will be rendered inoperable with a tie strap threaded loosely through the magazine well or revolver frame (never through the barrel) before submission to the Evidence Control Section.
- Crime Scene personnel may package the firearm and magazine together in one package:
  - The ammunition from the firearm will be packaged in a second package.
  - Both of these packages must be properly labeled with the case information, including LIMS number with an item number.
  - All of the related items (for Ballistics examination) may then be placed in a master package, with one chain of custody.
  - The Versadex bar code labels will be placed on the outermost layer of the master package.

.04 Collection and Packaging of Ammunition
- Every attempt should be made to locate and recover any ballistic related evidence. Assistance may be needed for deeply embedded projectiles or when embedded in difficult areas (vehicle tires and compartments).
- Fired ammunition should be packaged separately if located in different areas.
- Isolated pieces of ballistic evidence need to be packaged separately.
- Multiple fired casings in one area can be collected and packaged together.

.05 Crime Scene Reconstruction

- The investigator and Crime Scene Supervisor will make the determination at the scene if a Firearms Examiner is needed to assist in reconstruction.
- The following information should be documented on bullet strikes:
  - Horizontal and vertical measurements to the center mass of each bullet strike.
  - The entry and exit strikes should be examined and any unusual observations noted.
- A sketch or additional detailed sketches should be considered.

4 Gunshot Residue

.01 A gunshot residue collection kit may be used when requested by an investigator or patrol supervisor, however, this is not an instantaneous test for evidence of a crime. Crime Scene personnel should explain the limitations listed below to the requestor before collecting the sample(s).

- Crime Scene personnel will follow the instructions provided within the collection kit.
- Samples may be collected from vehicles as well as subjects.

.02 There are various limitations associated with this type of evidence:

- The Department of Public Safety (DPS) Laboratory will conduct the analysis and may require a year or more for results to be reported.
- Various DPS policies and time considerations apply (non-analysis of victim samples, collection of samples more than four hours after incident occurrence, etc.)
- Subjects discharging a firearm could still indicate negative and other subjects near a firearm when discharged may indicate positive if tested.
- .22 caliber ammunition may not be suitable for testing.

TOOL MARK EVIDENCE

Crime Scene Section personnel are responsible for documenting and collecting tool mark evidence from metal or other hard surfaces. Tool mark evidence can be a scratch, gouge, cut, or abrasion made when a tool is brought into contact with another object.

1 Examination

.01 Examine the tool mark for any trace evidence or any loosely adhering particles.

.02 Any trace evidence/particles should be documented and collected following the procedures described in the Photography and General Evidence Collection sections of this Technical Manual.

.03 Never attempt to fit a suspected tool into an observed tool impression.

2 Collection

.01 The entire object displaying the tool mark should be collected or removed from the object, if possible (e.g., tool mark on door striker plate).

.02 When it is not possible to collect the object displaying the tool marks, casting material may be used.

3 Casting

.01 Mikrosil and Accutrans casting material are available for use.

.02 Crime Scene personnel will utilize the instructions described in the Accutrans and/or Mikrosil sections of this manual.

ENTOMOLOGICAL EVIDENCE

Forensic Entomology is the use of insects as evidence in a criminal investigation. With the proper documentation and collection of entomological evidence, a forensic entomologist can provide a minimum post mortem interval (PMI).

1 Sample Section

.01 On those substrates where entomological evidence is observed, unknown samples should be collected at the discretion of the analyst.

2 Related Forms

.01 Forensic Entomology Data Form

3 Equipment

- Collection vials
- Forceps
- Thermometers
- Tape measure (located in CSU vehicles)
- Filter paper or paper towels
- Adhesive mouse traps
- Beef liver (in lab freezer)
- Sawdust, or similar cool, dry medium
- Solutions for preservation (ethyl alcohol and ethyl acetate)
- Plastic specimen cups
- Adhesive labels or masking tape
- Cardboard gun box (or similar, sturdy box)
- Shipping box
- Cotton balls

3 Documentation

.01 Visual Observations and Notations of the Scene:

- A Forensic Entomology Data Form must be completed while at the scene (or morgue) when this type of evidence is requested to be collected. It is important to the investigation that the form be as complete as possible, given the available information from detectives and observations at the scene.
- The following additional information should also be noted through digital photography:
  - Locations of major insect infestations on or near the decedent
  - Exact position of the decedent (exposure to sun/shade)
  - Insect activity apart from decedent (presence of dead adult flies, empty or full pupal cases, etc.)

.02 Collecting Climatological and Temperature Data

- Climatological data is critical when estimating a minimum PMI for a decedent. Insect development is determined largely by the temperature and relative humidity associated with those species present.
- After properly documenting the scene, the following temperatures should be taken:
  - Obtain an ambient air temperature by holding the thermometer in the air (in the vicinity of the decedent), for approximately one minute.
  - Additional ambient temperatures should also be taken at one-foot and four-foot heights near the decedent.
  - A ground surface temperature is obtained by placing the thermometer on the ground near the decedent.
  - A body surface temperature is obtained by placing the thermometer on the skin surface of the body.
  - An under-the-body temperature is obtained by sliding the thermometer between the body and the ground.
  - A maggot mass temperature is obtained by inserting the thermometer into the center of the maggot mass. If multiple masses are present, temperatures of each mass should be obtained; the location of each mass should be noted.
  - Soil temperatures (if applicable) should be taken immediately after the body is removed, at a point in the soil which was beneath the decedent prior to removal. A second soil temperature should be taken 3-6 feet from where the body was located. The thermometer should be placed between one and six inches down into the soil.

4 Collection and Preservation of Specimens

.01 Collection Prior to Body Removal

- Flying insects:
  - A sticky trap should be used to capture adult insects near the decedent. With the adhesive side facing outward, the sticky trap should be placed near the body; insects will land on the adhesive side of the trap. Placement of the trap should be done at the beginning of the evidence collection process, and it should be removed near the end. Times of placement and removal will be recorded.
  - Upon removal of the sticky trap, the analyst will carefully roll it, without overlap of the adhesive side; the adhesive side of the trap should be facing inward. Small pieces of tape may be used to secure the trap in the rolled position. Upon return to the lab, the trap will be labeled and placed into a sturdy box (e.g., gun box), to avoid it from being crushed during transport.
- Ground-crawling insects (other than maggots):
  - Forceps (or gloved fingers) may be used to gently collect any insects that are crawling on the ground or body.

  - The collected insects should be placed in an empty vial or specimen cup. The lid will be screwed tightly onto the container, and holes will NOT be punched through the lid.
  - Upon return to the lab, ethyl acetate-soaked cotton balls may be placed into the container to immobilize the insect.
- Fly Larvae (maggots) on the Body:
  - A representative sample of the largest larvae (or eggs, if no larvae are present) from various parts of the body should be collected and placed into empty vials.
  - Only the largest larvae should be collected.
  - A representative sample should encompass five to twenty of the largest larvae from each part of the body being sampled.
  - After collection on scene, the analyst's personal identifier (ie. SAB-1), time of collection, and location from where the sample was obtained will be written and adhered (ie. via masking tape) onto every container/item of entomological evidence.
  - Upon arrival to the lab, each container will be properly labeled with an adhesive LIMS item tag. Any additional information should be included on the vial as well. Such information should include:

-LIMS Item #	-Date/Time of Collection
-Case #	-Number of larvae
-D.I. #	-Location from body

  - An additional representative sample should be collected and placed into a specimen cup. These larvae will be kept alive and used for rearing (growing) purposes. Small holes must be punched through the top of this specimen cup.
  - Samples from different parts of the body should be kept separate. For example, samples from the head should be collected separately from samples from the torso. Be sure to label from which area of the body each vial was collected.
- At indoor scenes, the edges of the carpet and area beneath the carpet should be examined for pupae. If pupae are located, they should be placed into a specimen cup with small holes punched through its lid.

.02 Collection After Body is Removed

- In cases where bodies are outdoors and heavily infested, many larvae will remain on the ground after the body is moved.
- A representative sample of the larvae should be collected and placed into a vial.
- A second sample should be collected in a specimen cup, with holes punched through the top, for rearing purposes.
- Samples of leaves, bark, grass, or any material on the ground surface close to or under the body may be collected and labeled.

.03 Collection of Specimens at the Morgue

- If the body is transported to the morgue prior to collection of entomological evidence, collection should still be done following the aforementioned procedures.
- The temperature of the cooler, as well as the amount of time the decedent has spent in the cooler, should be obtained.
- The temperature of the maggot mass or masses, if applicable, should be obtained when the body is removed from the cooler.

5 Shipping and Rearing of Specimens

.01 Upon returning to the laboratory, preparation of the specimens should be done in the following manner:

- Preserved Larvae:
  - Using the microwave, bring tap water to a boil in a microwave-safe container (i.e. plastic tape container). No more than ¼ cup of water need be heated per vial.
  - One vial at a time, as to not mix larvae collected from different areas of the body, submerge all larvae from each vial into the boiling water for a few seconds. This is best achieved by placing a small funnel over the vial containing the fly larvae. Then carefully pour the hot water into the vial; flash-killing the maggots.
  - Once all specimens have been submerged in the hot water and killed, the vial contents should be poured back into the microwave-safe container; the original vial should be empty at this point in the process.
  - Fill the original vial about half-way full of ethyl alcohol, and use tweezers to transfer the boiled fly larvae back into the vial. At this point, any small larvae may be disposed of via the biohazard trash; only the largest 5-20 larvae should be placed back into the vial. Counting and noting the number of specimens in each vial is recommended. Secure the vial and ensure it is properly labeled.
  - Repeat this boiling and transferring of maggots to ethyl alcohol for each vial collected from the scene.
- Live Fly Larvae:
  - Place a ¼” to 1” deep layer of sawdust or other cool, dry medium into the bottom of an empty specimen cup.
  - Place a small piece of beef liver on top of the layer of sawdust. A small piece of filter paper or paper towel may be placed between the liver and sawdust, if preferred.
  - Small holes will be punched through the lid of the specimen cup.
  - The fly larvae collected on scene will be transferred into the above prepared specimen cup and then kept at room temperature in a drying room until shipped. The temperature of the room may be noted in the case notes.
  - If pupae or post-feeding larvae are collected for rearing purposes, these specimens should be placed into a specimen cup without beef liver. The bottom of the specimen cup should be filled with sawdust, or a similar

cool, dry material. ¼" to 1" full of material is sufficient. Store at room temperature and record the room temperature. Package in the same way as above.

.03 Vial(s) containing preserved (dead) fly larvae, specimen cup(s) containing live larvae (or pupae), and the sticky trap (which should be in a small, sturdy box) should be placed together in a large, exterior cardboard box.

.04 Small holes should be punched through the top of the exterior box, directly above the specimen cup of live larvae.

.05 It is recommended that bubble wrap or butcher paper be included in the package to protect the vials and avoid movement of the specimen cup(s); avoid placing such material on top of any specimen cups of live larvae/pupae.

.06 Do not secure the vials or specimen cups with red evidence tape; only the exterior box will be sealed in this manner.

6 Final Preparation of Evidence for Shipment

.01 The LIMS case number and employee's initials will be included on the Forensic Entomology Data Form and then scanned into the case file.

.02 The analyst may request, from Multi Media, selected photographs to be placed onto a compact disc to be sent to the Forensic Entomologist. This should be done after the analyst has obtained approval from the assigned detective to release the photographs.

.03 Fifteen to forty images should be placed onto the compact disc. These images should include, but are not limited to: photographs of the decedent's overall position, photographs of insect activity on and away from the decedent, a photograph of the thermostat on scene, an exterior overall photograph of the dwelling in which the decedent was found. The disc will be labeled with the General Offense and LIMS case numbers.

.04 The Forensic Entomology Data Form and compact disc of images will be placed into the exterior box with the entomological evidence, if possible.

.05 All appropriate Versadex tags, LIMS item tags, chain of custody, biohazard label and description labels will be adhered to the exterior side of the exterior box containing the entomological evidence.

.06 The analyst will contact the assigned detective, prior to submitting the entomological evidence to the Central Evidence Locker. If the investigator requests to have the specimens examined, the analyst will consult with the Crime Scene Supervisor to determine the transfer and/or shipping instructions.

.07 If the analyst transfers the evidence directly to a detective, a Transfer of Evidence form will be completed and scanned into the LIMS case file.

.08 The Forensic Entomologist will be contacted by the assigned detective and the specimens should be shipped as soon as possible.

NARCOTICS EVIDENCE

Crime Scene Section personnel should not collect narcotics. However, personnel may be requested to collect narcotic paraphernalia and to process narcotic related items for latent prints.

1 Safety

.01 Crime Scene personnel should use good judgment and extreme caution when working with any type of narcotic or related paraphernalia (i.e. syringes).

2 Responsibility

.01 Crime Scene personnel are responsible for determining if the narcotic paraphernalia is suitable for collection or processing for latent prints.

.02 The narcotic paraphernalia collected may contain residue, but no usable amount.

3 Processing

.01 Documentation of narcotic evidence should be done in the manner described in this Technical Manual prior to any processing or collection.

.02 The officer/investigator is responsible for making the determination if the narcotics will be collected and any subsequent collection of the evidence. If an officer is not present while processing the scene and narcotic evidence is discovered, one will be requested to the scene for collection.

.03 If processing of narcotics evidence is requested, an officer will remain with the evidence until processing is completed.

.04 If narcotic evidence is inadvertently collected in clothing or other items after being transported to the laboratory, the evidence will be documented and submitted to the Evidence Control Room.

FORENSIC VEHICLE PROCESSING FACILITIES

The Crime Scene Section is responsible for the processing and temporary storage of vehicles involved in various types of crimes. The Crime Scene Section has two facilities available for the storing and processing of vehicles.

1 Responsibilities

.01 Crime Scene employees are responsible for:
- Notifying supervisors of any mechanical defaults or inoperable equipment.

.02 Crime Scene Supervisors are responsible for:
- Ensuring the proper notifications are made to resolve any facility issues.

2 Procedures

.01 The facilities are for the temporary storage and processing of vehicles.
- Vehicles should be related to crimes and as such must be secured indoors, away from environmental hazards, to prevent the loss or destruction of evidence.
- Vehicles should not be stored inside the facility for “safekeeping” reasons.

.02 The following persons have the authority to request that a vehicle be placed in the facility for storage pending evidence collection:
- Any investigator
- Any Crime Scene Section personnel
- Patrol supervisors or officers acting under the direction of an investigator or patrol supervisor

.03 Crime Scene Supervisors have the authority to deny the storage request based on existing conditions within the facilities.

.04 Anyone not approved will utilize the Visitor Log (FSD10) when accessing the facilities.

.05 Crime Scene Section personnel will complete the Vehicle Processing Facility Check-In Logs (CS03), both inside the facility and in CS office, when securing or removing a vehicle at the facility.

.06 A Chain of Custody form must be completed for every vehicle that is placed into Crime Scene Section custody.
  - If a crime scene employee escorted the vehicle to the facility, the chain of custody will be initiated by that employee and will reflect the time the vehicle was first taken into their custody.

  - If the crime scene employee meets officers at the storage facility the chain of custody should be initiated with the signature of the officer who escorted the vehicle to the facility.
  - The crime scene employee will initiate the chain of custody if no one escorted the vehicle to the facility .
  - The chain of custody will include the case number and the full vehicle description.
- Maintaining Chain of Custody:
  - The crime scene employee taking custody of the vehicle will sign the chain of custody placing it in the facility.
  - The chain will be left with the vehicle where it will be easily noticed – preferably under the driver's side windshield wiper or on dash.
  - Any crime scene person working on that vehicle will sign the chain of custody and note "VPF" on the next line if vehicle is retained.
- Release of the Vehicle from the Facility:
  - Upon release of the vehicle, the releasing crime scene person will ensure that a member of the impound company or detective, if present, will sign the chain of custody.
  - Once this final signature is obtained, the chain will be returned for entry into the case record.
- Documenting the Release:
  - The releasing crime scene employee will initiate a report stating the vehicle was released and the chain of custody will be scanned into LIMS as an image.
  - Once the image is verified, the hardcopy is discarded.
  - The vehicle does not have to be entered as an item in LIMS. The description will be noted in the reports.
- This is only for vehicles that are placed in our facility. Vehicles that are processed and left in the field or bullpen do not fall under this procedure.

.07 Special requests for securing vehicles in the facility must be approved by the Crime Scene Section Supervisor or Assistant Manager.

.08 Vehicles will not be stored in the facility for a period exceeding 72 hours, unless approved by the Crime Scene Section Supervisor and/or the Assistant Manager.

.09 Once authorization has been granted by the investigator, Crime Scene personnel will make arrangements to have the vehicle removed.

.10 The vehicle keys must remain with the vehicle to be released to the city contracted towing company or designee.

.11 Each shift will be responsible for maintenance and upkeep of the facility and upon completion of work in the facility, all equipment will be cleaned and returned to its proper place and all supplies used will be replaced.

.12 Once a trashcan is full, it should be placed outside and the city contracted towing company personnel will be responsible for removing the trash.

.13 Biohazard trash will be transported to the Crime Scene Laboratory for disposal.

.14 Shifts will be responsible for the following:

- Ensuring that the trash is disposed of, that the air filter is changed monthly and that the fire extinguisher and eyewash station is current.
- Sweeping out the bay areas and ensuring that an adequate amount of dry sweep is available for any oil leaks.
- Ensuring the facility has an adequate amount of supplies (e.g., gloves, bags, paper towels, etc.)

MAJOR CRIME SCENE INVESTIGATION

1 Death Scenes

The Crime Scene Section is responsible for supporting investigators in the processing of death investigation scenes, including homicides, suicides, in-custody, accidental, and natural deaths. It is recommended these scenes be worked with an investigator present. Occasionally, these scenes may become volatile and or hostile in nature and will require immediate removal of the deceased via ambulance, etc. The crime scene may need to be suspended until such time that police can regain and maintain control.

.01 Responsibilities

- Crime Scene Specialists are responsible for:
  - Notifying the appropriate supervisor of any homicide or potential homicide scene.
  - Briefing the next on duty supervisor of any death scenes worked without an investigator present.
  - Notifying the appropriate supervisor, especially on high profile cases or any investigations involving departmental employees.

- Crime Scene Supervisor is responsible for:
  - Notifying the Assistant Manager of all homicide or potential homicide scenes.
  - Assigning tasks.

.02 Procedures

- Initial Callout
  - Record location of scene and the time call was received.
- Scene Arrival
  - Record time of arrival.
  - Upon arrival at the scene, establish contact with the primary officer or investigator. If homicide, sign in with officer maintaining crime scene entry log or if none, request that one be initiated.
  - Obtain a brief synopsis of the events that transpired (who has entered the crime scene, whether anything has been moved, and who moved it).
  - Determine whether the perimeter of the crime scene is adequate to preserve and protect any possible items of evidentiary value.
  - Crime Scene Specialists should refrain from processing the scene until the investigator arrives on scene or otherwise directed.
- Scene Assessment
  - Wear appropriate personal protective equipment and establish an indirect pathway in and out of the scene that will help prevent the destruction and or contamination of evidence.
  - If possible, complete a preliminary walk-through of the scene with the officer or assigned investigator, if present.

  - Ascertain whether any fragile evidence is present, and develop a plan for collection.
  - Determine the location of all evidence, including evidence that is not readily visible.
  - Determine whether any special equipment or additional personnel is needed.
  - Establish an appropriate area to place equipment while processing the scene.
- Documentation
  - Ensure the scene is photographed in accordance with the procedures outlined in the Photography chapter of this Technical Manual.
  - Ensure photographs are completed prior to a search being conducted and after tent markers are used.
  - Ensure videotaping is completed, if requested.
  - Maintain written notes.
- Search
  - Ensure that a proper search of the scene is conducted in order to identify any potential evidence present.
  - Ensure the scene is searched in accordance with the procedures outlined in the Search Methods chapter of this Technical Manual.
- Sketch
  - A sketch may be completed on homicide scenes at the discretion of the supervisor and investigator.
  - Sketches will be completed on other major scenes at the discretion of Crime Scene personnel or investigator.
  - Ensure the scene is sketched in accordance with the procedures outlined in the Sketching chapter of this Technical Manual.
- Evidence Collection
  - Ensure all documentation has been completed prior to collection of the evidence.
  - Ensure the Medical Examiner Investigator has completed his/her investigation prior to collecting evidence.
  - If possible, an investigator should be consulted in order to determine which items are of evidentiary value.
    - .1 The following types of evidence may be present at deceased person scenes, but are not limited to:
      - Fingerprints
      - Footprints, tire tracks, shoe impressions
      - Clothing
      - Trace evidence (hairs/fibers)
      - DNA (e.g., blood/saliva)
      - Weapons (e.g., knives, guns, ballistic evidence)
      - Toolmarks
      - Suicide notes or associated writings
      - Prescription medications
      - Narcotics

    - If the death is determined to be suspicious in nature, paper bags should be placed on the decedent's hands to protect any trace evidence that may be present.
    - A yellow trace evidence blanket should be placed in direct contact with the body to collect any evidence that may be present.
- Latent Print Processing
    - Ensure the scene is processed for prints in accordance with the procedures outlined in the Friction Ridge chapter of the Technical Manual.
    - Ensure the scene has been documented prior to processing.
    - Determine whether any special processing techniques will be required.
    - If an investigator is present, discuss which areas need to be processed.
- Final Survey
    - A walk-through of the crime scene should be completed to ensure the scene has been thoroughly processed, all evidence has been collected, and all equipment has been removed.
- Release of Crime Scene
    - Notify the officer or investigator when the processing of the scene has been completed.

2 Robbery and Aggravated Assault

The Crime Scene Section is responsible for the processing of robbery and aggravated assault scenes, which may include robberies of banks, businesses, and individuals, as well as home invasion, carjacking, shootings, stabbings, and beatings.

.01 Responsibilities

- Crime Scene Specialists are responsible for:
    - Ensuring that the crime scene is properly documented and all pertinent information and evidence is collected.
    - Notifying the appropriate supervisor, especially on high profile cases or any investigations involving departmental employees.
- Crime Scene Supervisors are responsible for:
    - Ensuring that reports and evidence are completed in a timely manner.

.02 Procedures

- Initial Callout
    - Record the location of the scene and the time the call was received.
- Scene Arrival
    - Record time of arrival.
    - Upon arrival at the scene, establish contact with the primary officer or investigator.
    - Obtain a brief synopsis of the events that transpired (who has entered the crime scene, whether anything has been moved, and who moved it).
    - Determine whether the perimeter of the crime scene is adequate to preserve and protect any possible items of evidentiary value.

    - Crime Scene Specialists should refrain from processing the scene until the investigator arrives on scene or otherwise directed and until condition of victim is confirmed.
- Scene Assessment
    - Wear appropriate personal protective equipment and establish an indirect pathway in and out of the scene that will help prevent the destruction and or contamination of evidence.
    - Complete a preliminary walk-through of the scene with the officer or assigned investigator, if present.
    - Determine whether a surveillance video of the incident is available. If plausible, view the tape prior to processing the scene for prints.
    - Determine whether any fragile evidence is present, and develop a plan for collection.
    - Determine the location of all evidence, including evidence that is not readily visible.
    - Determine whether any special equipment or additional personnel is needed.
    - Establish an appropriate area to place equipment to be used while processing the scene.
- Documentation
    - Ensure the scene is photographed in accordance with the procedures outlined in the Photography chapter of this Technical Manual.
    - Ensure photographs are completed prior to a search.
    - Ensure videotaping is completed, if requested.
    - Maintain written notes.
- Search
    - Ensure that a proper search of the scene is conducted in order to identify any potential evidence present.
    - A variety of search methods may be employed in accordance with the procedures outlined in the Search Methods chapter of this Technical Manual.
- Sketch
    - A sketch may be completed on robbery scenes at the discretion of the investigator or Crime Scene Section personnel.
    - Ensure the scene is sketched in accordance with the procedures outlined in the Sketching chapter of this Technical Manual.
- Evidence Collection
    - Ensure all documentation has been conducted prior to collection of the evidence.
    - If possible, an investigator should be consulted in order to determine what items of evidence should be collected.
        1. The following types of evidence may be present at robbery scenes, but are not limited to:
            - Fingerprints
            - Video evidence from surveillance cameras
            - Footprints, tire tracks, shoe impressions (e.g., from counter)

- Suspect clothing (e.g., facial mask, removed clothing)
- Victim's recovered property
- Trace evidence
- DNA (e.g., blood/saliva on suspect's facial mask)
- Weapons (e.g., knives, guns, ballistic evidence)
- Tool marks
- Notes (e.g., bank robberies)

- Latent Print Processing
  - Ensure the scene is processed for prints in accordance with the procedures outlined in the Friction Ridge chapter of this Technical Manual.
  - Ensure all documentation has been completed before processing.
  - Determine whether any special processing techniques need to be used.
  - If an investigator is present, discuss which areas need to be processed.
- Final Survey
  - A walk-through of the crime scene should be completed to ensure that the scene has been thoroughly processed, all evidence has been collected, and all equipment has been removed.
- Release of Crime Scene
  - Notify the officer or investigator when the processing of the scene has been completed.

3 Traffic

The Crime Scene Section is responsible for the processing of traffic investigations, which may include traffic fatalities, automobile vs. pedestrian/bicycle, serious injury collisions, and collisions involving city vehicles, etc.

.01 Responsibilities

- Crime Scene Specialists are responsible for:
  - Ensuring that the traffic scene is properly documented and all pertinent information and evidence is collected.
  - Notifying the appropriate supervisor on any investigations involving departmental employees.
- Crime Scene Supervisors are responsible for:
  - Ensuring that reports and evidence are completed in a timely manner.

.02 Procedures

- Initial Callout
  - Record location of scene and the time dispatched to call.
- Scene Arrival
  - Record time of arrival.
  - Upon arrival at the scene, establish contact with the primary officer or investigator.
  - Obtain a brief synopsis of the events that transpired (who has entered the crime scene, whether anything has been moved, and who moved it).

  - Determine whether the perimeter of the crime scene is adequate to preserve and protect any possible items of evidentiary value.
  - Crime Scene Specialists should refrain from processing the scene until the investigator arrives on scene or otherwise directed.
- Scene Assessment
  - Determine a pathway in and out of the scene that will prevent the destruction and/or contamination of evidence.
  - If possible, complete a preliminary walk-through of the scene with the officer or assigned investigator, if present.
  - Determine whether any fragile evidence is present, and develop a plan for collection.
  - Determine the location of all evidence, including evidence that is not readily visible.
  - Determine whether any special equipment or additional personnel is needed.
  - Establish an appropriate area to place equipment to be used while processing the scene.
  - Examine for the scene for the following:
    .1 Skid or black marks
    .2 Area of impact
    .3 Debris fields
    .4 Automotive parts
  - If the vehicles are present, examine for the following:
    .1 Evidence of alcohol involvement
    .2 Trace evidence (hairs/fibers/tissue on windshield)
    .3 Paint transfer
    .4 Fabric impressions
    .5 Bloodstains
- Documentation
  - Ensure that the scene is photographed in accordance with the procedures outlined in the Photography chapter of this Technical Manual.
  - Ensure photographs of scene and vehicles are completed prior to a search being initiated.
  - Ensure videotaping is completed, if requested.
- Search
  - Ensure that a proper search of the scene is conducted in order to identify any potential evidence present.
  - A variety of search methods may be employed in accordance with the procedures outlined in the Search Methods chapter of this Technical Manual.
- Sketch
  - A sketch is typically completed by an Accident Investigator, however a Crime Scene Specialist may complete a sketch if requested.
  - Crime Scene Specialists should ensure the scene is sketched in accordance with the procedures outlined in the Sketching chapter of this Technical Manual.
- Evidence Collection

- Ensure all documentation has been completed prior to the collection of the evidence.
- If possible, an investigator should be consulted in order to determine what items of evidence are of evidentiary value.
- The following types of evidence may be present at collision scenes, but are not limited to:
  - .1 Skid or black marks
  - .2 Area of impact
  - .3 Debris fields
  - .4 Alcoholic beverage containers

- Latent Print Processing
  - Ensure the scene is processed for prints in accordance with the procedures outlined in the Friction Ridge chapter of this Technical Manual.
  - Ensure the scene has been documented prior to processing.
  - Determine whether any special processing techniques need to be used.
  - If an investigator is present, discuss which areas need to be processed.
- Final Survey
  - A walk-through of the crime scene should be completed to ensure the scene has been thoroughly processed, all evidence has been collected, and all equipment has been removed.
- Release of Crime Scene
  - Notify the officer or investigator when the processing of the scene has been completed.

4 Sexual Assault

The Crime Scene Section is responsible for the processing of sexual assault scenes.

.01 Responsibilities

- Crime Scene Specialists are responsible for:
  - Ensuring that the sexual assault scene is properly documented and all pertinent information and evidence is collected.
  - Notifying the appropriate supervisor, especially on high profile cases or any investigations involving departmental employees.
- Crime Scene Supervisors are responsible for:
  - Ensuring that reports and evidence are completed in a timely manner.

.02 Procedures

- Initial Callout
  - Record location of scene and the time dispatched to the call.
  - Notify appropriate supervisor if necessary.

- Scene Arrival
  - Record time of arrival.
  - Upon arrival at the scene, establish contact with the primary officer or investigator.

  - Obtain a brief synopsis of the events that transpired (who has entered the crime scene, whether anything has been moved, and who moved it).
  - Determine whether the perimeter of the crime scene is adequate to preserve and protect any possible items of evidentiary value.
  - Crime Scene Specialists should refrain from processing the scene until the investigator arrives on scene or otherwise directs.
- Scene Assessment
  - Wear appropriate personal protective equipment and establish an indirect pathway in and out of the scene that will help prevent the destruction and or contamination of evidence.
  - Complete a preliminary walk-through of the scene with the officer or assigned investigator, if present.
  - Determine whether any fragile evidence is present and develop a collection plan.
  - Determine the location of all evidence, including evidence that is not readily visible.
  - Determine whether any special equipment or additional personnel is needed.
  - Establish an appropriate area to place equipment to be used while processing the scene.
- Documentation
  - Ensure the scene is photographed in accordance with the procedures outlined in the Photography Chapter of this Technical Manual.
  - Ensure photographs are completed prior to a search.
  - Ensure videotaping is completed, if requested.
  - Maintain written notes, and refrain from using the victim's actual name in the narrative of the report because of confidentiality concerns.
- Search
  - Ensure that a proper search of the scene is conducted in order to identify any potential evidence.
  - A variety of search methods may be employed in accordance with the procedures outlined in the Search Methods chapter of this Technical Manual.
- Sketch
  - A sketch may be completed on sexual assault scenes at the discretion of the investigator or Crime Scene Section personnel.
  - Ensure the scene is sketched in accordance with the procedures outlined in the Sketching chapter of this Technical Manual.
- Evidence Collection
  - Ensure all documentation has been conducted prior to collection of the evidence.
  - If possible, an investigator should be consulted in order to determine what items are of evidentiary value.
  - The following types of evidence may be present at sexual assault scenes, but are not limited to:
    1. Bedding (sheets/blankets/comforter)
    2. Condoms

3. Fingerprints
4. Shoe impressions, tire tracks, tool marks
5. Suspect Clothing (e.g., facial mask/discarded clothing)
6. Trace evidence (hair/fibers)
7. DNA (e.g., blood/saliva)
8. Weapons (e.g., knives, guns, and any ballistic evidence)
9. Evidence from victim:
10. Clothing worn at the time of the assault
11. Head hair standard
12. Pubic hair standard
13. Fingernail scrapings/clippings
14. Swabs of saliva/semen
15. Sexual Assault Evidence Kit (collected by SANE nurse)
16. Photographs of injuries (bruises/bite marks)
17. Evidence from suspect:
18. Clothing worn at the time of the assault
19. Head hair standard
20. Pubic hair standard
21. Fingernail scrapings/clippings
22. Buccal swabs
23. Penile swabs
24. Photographs of injuries

- Latent Print Processing
  - Ensure the scene is processed for prints in accordance with the procedures outlined in the Friction Ridge chapter of this Technical Manual.
  - Ensure the scene has been documented prior to processing.
  - Determine whether any special processing techniques need to be used.
  - If an investigator is present, discuss which areas need to be processed.
- Final Survey
  - A walk-through of the crime scene should be completed to ensure the scene has been thoroughly processed, all evidence has been collected, and all equipment has been removed.
- Release of Crime Scene
  - Notify the officer or investigator when the processing of the scene has been completed.

5 Child Abuse

The Crime Scene Section is responsible for the processing of child abuse investigations, which may include physical assaults, neglect, immersion burns, and shaken baby cases.

.01 Responsibilities

- Crime Scene Specialists are responsible for:
  - Ensuring that the child abuse scene is properly documented and all pertinent information and evidence is collected.

    - Notifying the appropriate supervisor on any investigations involving departmental employees.
- Crime Scene Supervisors are responsible for:
    - Ensuring that reports and evidence are completed in a timely manner.

.02 Procedures

- Initial Callout
    - Record location of scene and the time dispatched to the call.
    - Notify appropriate supervisor if necessary.
- Scene Arrival
    - Record time of arrival.
    - Upon arrival at the scene, establish contact with the primary officer or investigator.
    - Obtain a brief synopsis of the events that transpired (who has entered the crime scene, whether anything has been moved, and who moved it).
    - Determine whether the perimeter of the crime scene is adequate to preserve and protect any possible items of evidentiary value.
    - Crime Scene Specialists should refrain from processing the scene until the investigator arrives on scene or otherwise directed.
- Scene Assessment
    - Wear appropriate personal protective equipment and establish an indirect pathway in and out of the scene that will help prevent the destruction and or contamination of evidence.
    - If possible, complete a preliminary walk-through of the scene with the officer or assigned investigator, if present.
    - Determine whether a surveillance video of the incident is available. If plausible, view the tape prior to processing the scene for prints.
    - Determine whether any fragile evidence is present, and develop a plan for collection.
    - Determine the location of all evidence, including evidence that is not readily visible.
    - Determine whether any additional personnel or special equipment is needed, such as a digital thermometer or tape measure.
    - Establish an appropriate area to place equipment to be used while processing the scene.
- Documentation
    - Ensure the scene is photographed in accordance with the procedures outlined in the Photography Chapter of this Technical Manual.
    - Ensure photographs are completed prior to a search being completed.
    - Photograph any unsafe conditions and/or environmental hazards involving sleeping, feeding or playing.
    - Ensure videotaping is completed when requested, including any special considerations such as doll reenactments.
    - Maintain written notes.
    - Ensure all information is obtained in order to reconstruct the crime. (e.g., temperatures inside vehicle if child is left inside, height distance if child

has fallen, water temperatures and depth of water if immersion burn is suspected).

- Search
  - Ensure that a proper search of the scene is conducted in order to identify any potential evidence present.
  - A variety of search methods may be employed in accordance with the procedures outlined in the Search Methods chapter of this Technical Manual.
- Sketch
  - A sketch may be completed on child abuse scenes at the discretion of the investigator or Crime Scene Section personnel.
  - Ensure the scene is sketched in accordance with the procedures outlined in the Sketching chapter of this Technical Manual.
- Evidence Collection
  - Ensure all documentation has been conducted prior to collection of the evidence.
  - If possible, an investigator should be consulted in order to determine what items are of evidentiary value.
  - The following types of evidence may be present at child abuse scenes, but are not limited to:
    1. Bedding
    2. Bottles
    3. Diapers
    4. Cribs
    5. Car seat
    6. Item used to strike child (e.g., belt)
- Latent Print Processing
  - Ensure the scene is processed for prints in accordance with the procedures outlined in the Friction Ridge Chapter of this Technical Manual.
  - Ensure the scene has been documented prior to processing for prints.
  - Determine whether any special processing techniques need to be used.
  - If an investigator is present, discuss which areas need to be processed.
- Final Survey
  - A walk-through of the crime scene should be completed to ensure the scene has been thoroughly processed, all evidence has been collected and, all equipment has been removed.
- Release of Crime Scene
  - Notify the officer or investigator when the processing of the scene has been completed.

6 Arson

The Crime Scene Section is responsible for assisting the Austin Fire Department in the investigation of arson scenes. Property Crime Technicians may process scenes

involving vehicles or lesser monetary damage. Crime Scene Specialists may process scenes resulting in great monetary loss or the injury or death of an individual.

.01 Responsibilities

- Crime Scene employees are responsible for:
  - Ensuring that the arson scene is properly documented and all pertinent information and evidence is collected.
  - Notifying the appropriate supervisor, especially on high profile cases or any investigations involving departmental employees.
- Crime Scene Supervisors are responsible for ensuring that reports and evidence are completed in a timely manner.

.02 Safety Procedures

- Personnel should use caution when entering a scene due to a variety of hazards that may be present.
- Crime Scene personnel will not enter the scene until fire personnel have determined the scene is safe to enter.
- The scene should remain undisturbed until the Austin Police Department Investigator or Arson Investigator assigned to the case has had the opportunity to assess the scene. The scene will be processed under their direction.
- Personnel will adhere to all safety guidelines while in the crime scene and be on guard for immediate evacuation if required.

.03 Procedures

- Initial Callout
  - Record location of scene and the time dispatched to the call.
- Scene Arrival
  - Record time of arrival.
  - Upon arrival at the scene, establish contact with the primary officer, complainant, investigator, or fire investigator.
  - Obtain a brief synopsis of the events that transpired (who has entered the crime scene, whether anything has been moved, and who moved it).
  - Determine whether the perimeter of the crime scene is adequate to preserve and protect any possible items of evidentiary value.
  - Crime Scene Specialists should refrain from processing the scene until the investigator arrives on scene or otherwise directed.

- Scene Assessment
  - The responding employee will ascertain the scope of the scene. If there are injuries to any person or extensive monetary loss, the employee will notify a supervisor, who will make the decision as to who will process the scene.
  - Determine an indirect and safe pathway into and out of the scene, avoiding areas where the suspect would likely have traveled.
  - Complete a preliminary walk-through of the scene with the officer or assigned investigator, if present.

  - Determine whether any fragile evidence is present, and develop a plan for collection.
  - Determine the location of all evidence, including evidence that is not readily visible.
  - Determine whether any special equipment or additional personnel is needed.
  - Establish an appropriate area to place equipment to be used while processing the scene.
- Documentation
  - Ensure the scene is photographed and videotaped in accordance with the procedures outline in the Photography and Videography chapters of this Technical Manual.
  - Maintain written notes.
- Search
  - Ensure the scene is searched in accordance with the procedures outlined in the Search Methods chapter of this Technical Manual.
- Sketch
  - A sketch may be completed on arson scenes at the discretion of the investigator or Crime Scene Section personnel.
  - Ensure the scene is sketched in accordance with the procedures outlined in the Sketching chapter of this Technical Manual.
- Evidence Collection
  - Ensure all documentation has been conducted prior to collection of evidence.
  - If possible, an investigator should be consulted to determine what items are of evidentiary value.
  - The following types of evidence may be present at arson scenes, but are not limited to:
    - .1 Gas can
    - .2 Accelerants
    - .3 Lighter/lighter fluid
    - .4 Latent fingerprints
    - .5 Footprints, tire tracks and tool marks
    - .6 Trace evidence (hairs, fibers)
    - .7 DNA
  - Evidence that contains an accelerant residue will be sealed in a clean, airtight, metal paint can.
  - Collect a control sample of the same material that does not have the accelerant present, if possible.
  - One liquid ounce of an accelerant is adequate for laboratory analysis.
  - The liquid will be collected in a small paint can and sealed.
- Latent Print Processing
  - Ensure the scene has been documented prior to processing.
  - If an investigator is present, he/she should be consulted as to what areas should be processed.
  - Ensure the scene is processed for prints in accordance with procedures outlined in the Friction Ridge Chapter of this Technical Manual.

    - Determine whether any special processing techniques should be used.
    - If a surface is covered heavily with soot, the recommended processing method is to attempt several tape lifts until the soot is removed. Examine the tape for any friction ridge detail.
- Final Survey
    - A walk-through of the crime scene should be completed to ensure the scene has been thoroughly processed, all evidence has been collected, and all equipment has been removed.
- Release of Crime Scene
    - Notify the officer or investigator when the processing of the scene has been completed.

7 Autopsy Processing

When requested or necessary, Crime Scene Section personnel may assist in the documentation of deceased persons at the Travis County Medical Examiner's Office. The Medical Examiner's Office has jurisdiction and control of the bodies.

.01 Safety

- Crime Scene personnel will follow the recommended safety precautions as described in the Safety Manual.

.02 Related Documents

- Travis County Medical Examiner's Release of Evidence Form

.03 Procedure

- If requested, personnel will contact the Homicide Unit or the Medical Examiner's Office to coordinate what time the autopsy will begin.
- Crime Scene personnel should obtain the victim's name, date of birth, race, and sex, when known. Confirm the information with the tag on the body, if present.
- Only one body should be processed at a time.
- If photographs are requested:
    - Photographs will be taken at the direction of the investigator and the Medical Examiner.
    - Refer to the Photography chapter of this Technical Manual for a detailed description of photography techniques.
- When necessary, friction ridge exemplars may be obtained.
    - Known finger and palm prints should be obtained on deceased persons at the discretion of the investigator. If it is determined that the decedent has a record on file containing good quality ten prints and palm prints, only a single digit may be required for verification of identification.
    - The verification process will be completed in a timely manner, prior to the decedent being released from the Medical Examiner's custody.
    - Known footprints will be obtained at the discretion of the investigator.
    - The prints should be of good quality and clarity.

  - In the case of badly decomposed fingers or palms, every attempt should be made to capture the best prints possible using any method that is available.
  - The back of the prints should be labeled with the L#, case number, date, employee name and number, victim's name, date of birth, sex, race, and description of where the print came from (e.g., right hand).
  - All post-mortem prints collected from the Travis County Medical Examiner's Office will be treated as an item of evidence. The post-mortem prints will be entered into Versadex as "Latent Prints" and submitted to a Central Evidence Locker.
  - The post-mortem prints will be packaged in a large envelope and sealed ensuring all Standard Operating Procedures are followed. Each envelope will be stamped "*Deceased Morgue Prints*" so Evidence Room personnel will be aware that they need to forward the post-mortem prints to the Latent Print Section.
- Evidence Collection
  - Evidence will be collected at the discretion of the investigator.
  - When evidence is collected from the Medical Examiner's personnel, the personnel will provide the Crime Scene Specialist with a Travis County Medical Examiner's Release of Evidence Form.
  - The form will describe the items that were released to the Specialist.
  - The form should be scanned into the case record.
- Photographs of the evidence should be taken at the discretion of the analyst or if requested by the investigator.
- The following types of evidence should be considered for collection when applicable:
  - Fingernail scrapings/clippings
  - Hairs/fibers
  - Known hair samples
  - Yellow evidence blanket
  - Bloodstains
  - Semen
  - Saliva (bite marks)
  - Known blood sample
  - SEM Kit
  - Recovered ammunition
  - Clothing/Jewelry
  - Processing for prints directly on body
  - Known prints, including palms and feet – if necessary

.04 Disposition of Evidence

- All digital images are downloaded into the Digital Crime Scene Management System (DCSMS).
- Known prints and any other evidence will be submitted to the Evidence Control Lockers (CEL).

PROPERTY CRIME SCENE INVESTIGATION

1 Burglary of Residence or Non-Residence

Crime Scene personnel are responsible for processing burglary scenes. Each scene must be evaluated and any potential evidence should be recognized, documented, collected, and preserved in the manner in which each Technician has been trained.

.01 Related Forms

- None

.02 Procedure

- Scene Arrival
  - Contact complainant/victim and/or officer.
  - Obtain pertinent information, such as name, contact numbers, times, items taken, potential suspects, etc.
- Scene Assessment
  - Determine point of entry and exit.
  - Determine method of entry, (e.g., broken window, kicked-in door).
  - With complainant, determine the areas affected by burglary.
  - Determine whether suspect left anything behind, (e.g., tools, blood, clothing, note).
- Documentation
  - List areas affected and describe.
  - If damage is excessive, photography may be necessary, (i.e. sheetrock/furniture smashed, spray painted, etc.).
  - Document where evidence is located and photograph those items or areas which may require further analysis, such as - blood pattern at point of entry, shoe impression(s), patent prints, tool marks, etc.
- Evidence Collection
  - Determine whether the item has evidentiary value, such as - a rock vs. a screwdriver or brought and left by suspect.
  - Evidence should be processed at the scene, but may be collected for processing at the lab, if determined necessary.
  - Document and collect the evidence, especially biological evidence present, prior to processing the item or scene for latent prints.
  - Collected evidence should be properly secured for transport as detailed in this Technical Manual.
- Latent Print Processing
  - Begin at point of entry and process those surfaces that are conducive for obtaining latent prints, such as - glass, ceramic, smooth surfaces, etc.
  - Process each affected area.
  - A description and a diagram will be noted on the back of the latent card indicating where the latent was located. An arrow should be used to indicate print direction.
  - Prints lifted from different areas will be placed on separate latent cards.

    - Process through point of exit.
- Scene Conclusion
    - Collect your equipment, items of evidence and latent cards.
    - Conduct a final walk-through of the scene, as needed, to determine whether all affected areas have been processed and if any equipment has been left behind.
    - Answer any questions from complainant/victim and ensure that the case number has been verified.
    - Leave the victim with the correct investigative contact information, including case number.
    - Leaving the immediate area may be desired (in order to back latent cards and write report).

2 Burglary of Vehicle

Crime Scene personnel are responsible for processing burglary of vehicles. Each scene must be evaluated and any potential evidence should be recognized, documented, collected, and preserved in the manner, in which each Technician has been trained.

.01 Related Forms
- None

.02 Procedure
- Scene Arrival
    - Contact complainant/victim and/or officer.
    - Obtain all pertinent information, such as - name, contact number, time frame of occurrence, items taken, potential suspects, vehicle year, make, model, license plate, vehicle identification number, etc.
- Scene Assessment
    - Determine point and method of entry, if possible, (i.e. tool marks, keys used, etc.).
    - Note exact location where vehicle was located, (i.e. large mall parking lot, on street, in driveway, in parking garage, etc.).
    - With complainant, determine what in vehicle has been affected.
    - Determine if suspect left anything behind, (i.e. tools, blood, etc.).
- Documentation
    - List affected areas, (i.e. doors found unlocked or ajar, if alarm is activated, glove box, center console or trunk ajar, etc.).
    - Note what item(s) were taken and how removed, (i.e. stereo taken, wires cut or torn, etc.).
    - If damage is excessive, photography may be necessary.
    - Document where evidence is located and photograph those items or areas which may require further analysis, such as – blood patterns, shoe impressions, patent prints, etc.
- Evidence Collection
    - Determine whether the item has evidentiary value, such as – a rock vs. a screwdriver or brought and left by suspect.

    - Evidence should be processed at the scene, but may be collected for processing at the lab, if determined necessary.
    - Document and collect the evidence, especially biological evidence present, prior to processing the item or scene for latent prints.
    - Collected evidence should be properly secured for transport.
- Latent Print Processing
    - Begin at point of entry and process those surfaces that are conducive for obtaining latent prints, such as – glass, ceramic, smooth surfaces, etc.
    - Describe and draw a diagram on the back of the latent card of where the latent was located and use an arrow to indicate print direction.
    - If more than one vehicle is processed, indicate vehicle make, model, and last four of VIN (if known) on the back of each latent card.
    - Ensure that the complete VIN is noted in the report narrative.
- Scene Conclusion
    - Collect equipment, items of evidence and latent cards.
    - Look through vehicle once again to determine whether all affected areas have been processed.
    - Answer any questions from complainant/victim and leave contact information.
    - Ensure that case number has been verified and leave immediate area in order to back latent cards and write report, if desired.

3 Auto Theft Recovery

Crime Scene personnel are responsible for processing recovered stolen vehicles. Each vehicle must be evaluated and any potential evidence should be recognized, documented, collected, and preserved in the manner, in which each Technician has been trained.

.01 Related Forms
- Impound/Wrecker Selection Report
- Vehicle processed notification

.02 Procedure
- Scene Arrival
    - Establish contact with the primary officer, if any, and obtain pertinent information.
    - If responding to a vehicle impound storage facility, contact the facility employee and obtain the wrecker sheet for pertinent information, such as - case number, the address from which the vehicle was recovered, all vehicle information (year, color, make, model, LP and VIN, etc.).
    - Confirm the VIN through dispatch and ensure that the correct vehicle has been recovered as stolen. If so, inform dispatch that the vehicle should be removed from TCIC/NCIC.
    - If the original auto theft occurred outside of Austin Police Department jurisdiction (OOC), but it is recovered in Austin, it will not be processed unless approved by a Crime Scene Supervisor.

  - If OOC, ensure that an initial auto theft report has been completed. The vehicle should then be impounded with a hold placed on it for the originating agency.
  - If the vehicle is an outside agency auto theft, but involved in a crime within the Austin Police Departments jurisdiction, processing will be conducted at the request of an investigator or patrol supervisor.
- Scene Assessment
  - Determine point and method of entry, if possible (keys may have been used, etc.).
  - Note exact location of vehicle (i.e. large mall parking lot, on street, etc).
  - Determine if suspect left anything behind (i.e. tools, blood, etc). No drugs of any kind will be collected.
  - If it is determined that the license plate(s) are in fact stolen and does not return to the owner, the plate(s) must be collected as recovered stolen property. Process the plate(s) separately under a new case number (or the original theft case number if assigned), but reference each number.
- Documentation
  - List any damage to the vehicle interior and exterior (i.e. what was taken? is it stripped? are tires gone? steering column damaged? etc.).
  - Document items left in vehicle.
  - If damage is excessive, photography may be necessary.
- Evidence Collection
  - Determine whether item(s) have evidentiary value, such as – a rock vs. a screwdriver or brought and left by suspect.
  - Evidence should be processed at the scene, but may be collected for processing at the lab, if determined necessary.
  - Document and collect the evidence, especially biological evidence present, prior to processing the item or scene for latent prints.
- Latent Print Processing
  - Begin at point of entry, if determined, or start at the driver's door, but all processing should be conducted in a systematic and methodical manner.
  - Process all areas which may have been handled by the suspect, such as - rearview mirrors, seatbelt latches, visor mirrors, door handles, etc.
  - Process entire vehicle, unless specific areas can be determined.
  - Describe and draw a diagram on the back of the latent card of where the latent was located and use an arrow to indicate print direction.
  - If more than one vehicle is processed, place vehicle make, model, and last four of VIN (if known) on the back of each latent card.
  - Ensure that the complete VIN is noted in the report narrative.
- Scene Conclusion
  - Collect equipment and latent cards.
  - Look through vehicle once again to determine whether all affected areas have been processed.
  - Complete a 'vehicle processed' notification, that the vehicle has been processed, and leave it clearly visible on or in the vehicle.

- If processed at a recovered location, request the city contract wrecker for the towing of vehicle. Inform dispatch of any special towing conditions, such as - no tires on vehicle, in difficult location, 18 wheeler, etc.
- Complete an Impound/Wrecker form for the wrecker driver to sign. Separate the pink copy from the form and give to driver after signing.
- Holds will not be placed on processed vehicles, except in the case of OOC recoveries or upon approval by a Crime Scene Supervisor.
- Once the vehicle is secured on the wrecker, back latent cards and write report, or complete work product while waiting for the wrecker.
- The vehicle may be released to the registered vehicle owner, if present, with proper identification (picture ID) or approval from a Crime Scene or Patrol Supervisor.
- The only police action authorized to be conducted by Crime Scene personnel is for the impounding of vehicles. Once the vehicle has been "released to owner" no other action will be required. Requests for wreckers on behalf of the owner may be provided as a courtesy, but an Impound/Wrecker form will not be completed.

4 Criminal Mischief

Crime Scene personnel are responsible for processing criminal mischief scenes. Each scene must be evaluated and any potential evidence should be recognized, documented, collected, and preserved in the manner, in which each Technician has been trained.

.01 Related Forms

- None

.02 Procedure

- Scene Arrival
  - Contact complainant/victim and/or officer.
  - Obtain pertinent information, such as – name, contact numbers, times items taken, potential suspects, etc.
- Scene Assessment
  - Determine what type of criminal mischief (e.g., vandalism, graffiti, etc.).
  - Determine method of mischief (e.g., damage to vehicle, spray-painted wall, etc.).
  - Determine if suspect left anything behind, (e.g., paint can, tools, blood).
- Documentation
  - List areas affected and how.
  - Photographs of the damage should be taken, especially when it may provide valuable information to the investigator.
  - If graffiti, describe what was written or drawn and what color paint/marker was utilized.
  - If vandalism, describe damage and determine whether the criminal mischief is an attempted burglary.
- Evidence Collection

    - Determine whether the item has evidentiary value, such as - a rock vs. a screwdriver.
    - Determine whether the evidence can be processed at the scene or should be collected for processing at the lab.
    - Document and collect the evidence, especially biological evidence present, prior to processing the scene for latent prints.
- Latent Print Processing
    - Begin at point of entry and process those surfaces that are conducive for obtaining latent prints, such as - glass, ceramic, smooth surfaces, etc.
    - Process each affected area.
    - Describe and draw a diagram on the back of the latent card of where the latent was located and use an arrow to indicate the print direction.
    - Process through point of exit.
- Scene Conclusion
    - Collect your equipment and latent cards.
    - Conduct a final walk-through of the scene, as needed, to determine whether all affected areas have been processed and if any equipment has been left behind.
    - Answer any questions from complainant/victim and leave contact information.
    - Ensure the case number has been verified.
    - Leave immediate area, in order to back latent cards and write report, if desired.

5 Found Property

Crime Scene personnel are responsible for collecting found property on occasion. Found Property calls are not considered a high priority and should be answered only after calls involving processing are no longer pending. Found Property will not be collected unless it meets the criteria as explained in APD Lexipol Policy Manual.

.01 Related Forms
- None

.02 Procedure
- Scene Arrival and Assessment
    - Contact the complainant, if present.
    - Crime Scene personnel will only seize items of abandoned or found property which:
        - .1 Are readily identifiable and traceable, (e.g., serial number, engravings).
        - .2 Are of value, such as money or jewelry.
        - .3 Appear to have been involved in a criminal offense.
        - .4 Constitute a hazard to the public safety.
        - .5 May be offensive to public morals or sensitivities.
    - Determine if dispatch needs to contact the Sanitation Department to arrange pick up of items that are determined to be of no monetary value.

- Documentation
  - Document location of the property, (e.g., found on street, near dumpster).
  - Document any damage to property.
- Evidence Collection and Latent Print Processing
  - If it is related to a crime, process it for evidence and submit the item and subsequent evidence to the evidence control room using the original crime case number.
  - If not, collect and transport it to the evidence control room.
  - ALL found weapons (especially firearms) must be processed for evidence (i.e. DNA, trace, latent prints, etc.), unless approval not to process is obtained from a Crime Scene Supervisor.
  - Potential DNA evidence will be collected sequentially as directed in this Technical Manual.
- Scene Conclusion
  - If ownership can be determined, use “reasonable” effort(s) to locate and return the property to the rightful owner (e.g., wallet with driver’s license).

6 Theft

Crime Scene personnel are responsible for processing theft scenes. Each scene must be evaluated and any potential evidence should be recognized, documented, collected, and preserved in the manner, in which each Technician has been trained.

.01 Related Forms
- None

.02 Procedure
- Scene Arrival
  - Contact complainant/victim and/or officer.
  - Obtain pertinent information, such as - name, contact numbers, times, items taken, potential suspects, etc.
- Scene Assessment
  - Determine how items were taken and any evidence to be collected.
  - Determine method of entry (e.g., suspect walked into an open office and took purse from drawer, suspect stole bike from patio).
  - With complainant, determine the areas affected by the theft.
  - Determine if suspect left anything behind, (e.g., tools, blood).
- Documentation
  - List areas affected and how.
  - Document where evidence is located and photograph those items or areas which may require further analysis, such as - blood pattern at point of entry, shoe impression(s), patent prints, etc.
- Evidence Collection
  - Determine whether the item has evidentiary value, such as - a rock vs. a screwdriver or brought and left by suspect.

    - Evidence should be processed at the scene, but may be collected for processing at the lab, if determined necessary.
    - Document and collect the evidence, especially biological evidence present, prior to processing the item or scene for latent prints.
- Latent Print Processing
    - Begin at point of entry and process those surfaces that are conducive for obtaining latent prints, such as - glass, ceramic, smooth surfaces, etc.
    - Process each affected area.
    - Describe and draw a diagram on the back of the latent card of where the latent was located and use an arrow to indicate the print direction.
    - Process through point of exit.
- Scene Conclusion
    - Collect your equipment and latent cards.
    - Conduct a final walk-through of the scene, as needed, to determine whether all affected areas have been processed and if any equipment has been left behind.
    - Answer any questions from complainant/victim, leave contact information and ensure that case number has been verified.
    - Leave immediate area, in order to back latent cards and write report, if desired.

7 Forgery and Counterfeit

Crime Scene personnel are responsible for processing forgery and counterfeit scenes. Each scene must be evaluated and any potential evidence should be recognized, documented, collected, and preserved in the manner, in which each Technician has been trained.

.01 Related Forms

- None

.02 Procedure

- Scene Arrival and Scene Assessment
    - Contact complainant/victim and /or officer.
    - Obtain pertinent report information.
    - Inquire whether merchant has surveillance cameras. If a time can be determined when the forgery/counterfeit occurred, obtain a copy of the video surveillance tape/DVD, if possible.
- Documentation
    - Document all suspect information if available.
    - If forgery, document the check information (e.g., check payee, payer, check number, account number, date and amount).
    - If counterfeit bill, document bill serial number and denomination.
- Evidence Collection
    - Collect all related forgery items and package accordingly.
- Scene Conclusion

- No immediate processing for latent prints will be conducted, unless approved by a supervisor.
- Submit all evidence to the Evidence Control Room.

EQUIPMENT OPERATIONS

- Properly functioning equipment is essential in the performance of crime scene investigative duties. The equipment must be maintained and utilized in a careful manner in order to avoid injuries, loss of evidence and untimely repairs.

- The check procedures listed below are generally considered to be the minimum appropriate in each case, providing that the equipment is of good quality and of proven stability. Employees should have the proper training and expertise to perform adequate functionality checks In order to provide and maintain the quality of the work provided in the Crime Scene Laboratory, it is necessary to ensure equipment is in good working order. Routine quality control and functionality checks should accomplish this. If there is any question concerning the reliability of an instrument or piece of equipment, a supervisor or management should be notified immediately.

  .01 All repairs or replacements must be authorized by a supervisor and or the Assistant Division Manager before a service request may be initiated.

  .02 There will be no unauthorized use of any equipment assigned to another employee. This equipment will include flashlights, radios, cameras, etc.

  .03 No employee will use another employee's equipment without first obtaining direct approval from a supervisor.

  .04 As a matter of courtesy, permission from the assigned employee should also be obtained, or notification of the equipment use should be given to the assigned employee.

1 Crime Scene Vehicles

.01 The Crime Scene Section is assigned vehicles to conduct business. The purpose of these vehicles is to enable the employee to respond to crime scenes and support investigations.

.02 Responsibilities
- Employees are responsible for following the guidelines in the Lexipol Policy Manual and Forensic Division Operations Manual.
- Supervisors, or designees, are responsible for:
  - Ensuring guidelines are followed pertaining to operations of section vehicles.
  - Ensuring that the vehicles are in proper operating condition and that any preventive maintenance or malfunctions are resolved in a timely manner.

.03 Procedures

- Operation and Control
  - Only one employee per vehicle, unless prior approval is obtained from the Supervisor or Assistant Manager.
  - Before the initial use, the employee will inspect the vehicle for any damage, cleanliness, service due date, and assigned equipment. Any deficiencies will be reported to the Supervisor as soon as possible.
  - If a collision occurs involving a departmental vehicle, guidelines prescribed in Lexipol Policy Manual will be followed.
    .1 The employee will write a narrative describing the incident using the official memo format as soon as possible after the incident. The memo will then be forwarded to the responsible supervisor.
  - Employees will return the vehicle keys to the keyboard located in the Crime Scene office at the end of their shift.
  - A Supervisor will be notified when an employee takes vehicle keys home. The employee may be required to return them immediately if necessary.

2 Radios

.01 Crime Scene section personnel are assigned individual hand held radios as one form of communication.

.02 Operation

- Radio operation will be conducted according to Department's Lexipol Policy Manual.
- Personnel are assigned individual radios that they maintain. The radio should be noted on their personal inventory list from Police Equipment.
  - Portable radios will be returned to APD Police Equipment upon separation from the Crime Scene Section.
- Radios will be operated according to the training received.
- Radios will always be turned off before any battery or antenna replacement.
- Personnel will ensure that a charged battery is available for duty.

.03 Equipment Maintenance

- It is the responsibility of employees to report any malfunctioning radio to a Supervisor.
- If the malfunction occurs while in the field, the supervisor and Communications Division will be notified immediately. The employee may be authorized to submit the radio directly to the radio shop for service.
- It is the Supervisors' responsibility to ensure that the radios are working properly and that any malfunctioning radio be repaired or replaced in a timely manner.

3 Laptop Computers (Toughbooks)

.01 The Crime Scene Section utilizes laptop computers as a form of communication. They are also used for documentation of work performed and in preparing supplemental reports.

.02 Operation
- The laptop computers should be used for official business only.
- The laptop computers are assigned and mounted in the Crime Scene Section vehicles. The laptop should be locked in the mount when installed in the vehicles.

.03 Equipment Maintenance
- It is the responsibility of employees to report any malfunctioning laptop computer to a Supervisor.
- It is the Supervisors' responsibility to ensure that the laptop computers are working properly and that any malfunctioning laptop computer is repaired or replaced in a timely manner.

4 Cell Phones

.01 Crime Scene Supervisors must be able to communicate with their personnel operating in the field at any time during the shift. The Crime Scene Section utilizes cell phones as one form of communication. Cell phones are provided by the Department and should be used for official business only. Private cell phones may be used on a voluntary basis.

.02 Operation
- Department cell phones are available for CS Specialists to communicate with supervisors, detectives, etc. while working major cases. These cell phones may be used by PC Technicians, only with supervisor approval.
- Authorized personnel can check out a cell phone at the beginning of their shift as part of their equipment.
- At the end of shift, the cell phone should be returned to the equipment room and placed on a charger.
- If a Specialist chooses to use their own cell phone for work related communication, the Specialist will be responsible for informing the supervisor of the cell phone number to be used.

.03 Equipment Maintenance
- It is the responsibility of employees to report any malfunctioning cell phone to a Supervisor.
- It is the Supervisors' responsibility to ensure that the cell phones are working properly and that any malfunctioning cell phone is repaired or replaced in a timely manner.

5 Metal Detectors

.01 Crime Scene Section personnel are responsible for searching for items that are metal and not readily visible. These items may include weapons, bullets, and casings. The use of a metal detector can often assist in searching grassy, wooded, and overgrown areas for items of evidence that may be located on the surface or sub-surface.

.02 Equipment
- Garrett Metal Detector
- Sixteen (16) AA Batteries (eight (8) per holder)
- Testing Items

.03 Responsibility
- Crime Scene personnel are responsible for ensuring that the equipment is working properly and that the battery holders are maintained properly.
- Crime Scene personnel are responsible for removing the batteries from the battery holders at the end of each use.
  - The batteries will be separated and should be stored in the glove compartment.
  - The empty battery <u>holders</u> will be stored in the metal detector housing.
- Crime Scene Supervisors are responsible for ensuring that the metal detectors are available and that any malfunctioning metal detectors are repaired if feasible.

.04 Procedure
- Scanning recommendations:
  - Do not hurry. Scan the search coil lightly at a speed of one to two feet per second. However, the search coil must be kept in motion for maximum detection.
  - Maintain the search coil as flat and as level as possible to the ground, at a height of one to two inches above the ground being searched.
  - Move the search coil back and forth while you walk at a pace that is comfortable. Do not skip any areas.
  - Overlap each scan sweep at 50% of the search coil width.
  - A strip method search pattern is recommended, however different search patterns should be evaluated with the area to be searched to determine which is the most practical. (Refer to Crime Scene Search Procedures in this manual).
  - Refer to the Garrett Metal Detector handbook for additional operating instructions.

.05 Testing
- The metal detector should be checked for functionality before each use.
- The metal detector may be checked by using one of the following:
  - live round

  - fired cartridge case
  - coin, etc.
- Any malfunctioning equipment will be brought to the attention of the Crime Scene Supervisor for repair or replacement.

6 Electrostatic Dust Print Lifters (ESDL)

.01 The electrostatic dust print lifters are utilized in the field or laboratory for the recovery of dust impressions. The following are the guidelines for using the electrostatic dust print lifter in the field.

.02 Quality Control Procedure
- The electrostatic dust print lifters should be visually inspected for functionality before use. They may be charged for a period of 24 hours or change batteries, if battery use will be needed.

.03 Operating Procedures
- Once dust print impression is located or an area is suspected, a section of the metallic tint film (from provided roll) is placed over the impression – metallic side up.
- Power is applied from the ESDL, to the metallic side of the tint, and any bubbles are pressed to the side with the soft roller provided.
- The charge is allowed to dissipate and all identification information and an orientation arrow will then be marked in a corner of the tint.
- The evidence lift will be marked in place with orientation and identifying information before removal.
- The tint is then removed and secured for transport to the lab.
- The impression should be photographed with scale before packaging for comparison purposes.
- It is important to remember that dust lifts are reversed when collected and steps should be taken to ensure that the dust print is documented in its proper orientation.
- The impression should be securely packaged in a rigid cardboard box and within a second cardboard box surrounded by cushioning.

.04 Maintenance Procedure
- In the event that an electrostatic dust print lifter is not functioning properly, a supervisor or management should be notified immediately.

7 Forensic Light Sources

.01 Forensic Light Sources are utilized in the Crime Scene Laboratory and in the field for the development of latent print evidence and the searching for trace evidence. Latent print evidence examinations are accomplished by using dye stain combinations to cause the fluorescence of latent prints. The evidence requires basic observations and procedures prior to actual instrumental

analyses. (Inherent) Luminescence of latent prints and other types of evidence can occur without chemical processing in certain situations.

.02 Safety

- Safety guidelines are addressed in the Division Safety Manual and the Crime Scene Standard Operating Procedures.

.03 Equipment / Materials / Reagents

- Proper safety goggles for band being used
- Latex or Nitrile gloves
- Laboratory coat

.04 Standards, Controls, and Calibration

- Quality Control Procedure
  - The forensic light sources should be checked for functionality before each use.
- Maintenance Procedure
  - If the light source is not functioning properly, a supervisor or management should be notified as soon as possible. Only a qualified service technician may repair the instrument.
- Operating Procedure
  - The appropriate operations manual for utilizing the forensic light sources may be consulted for evidence analysis.
  - Use of the forensic light source should be conducted in a properly labeled and controlled environment.
  - Ensure that anyone else in the vicinity is aware that the light source is in use.
  - If friction ridge detail becomes evident under the forensic light source, it constitutes a positive result. If sufficient ridges are apparent and enough detail exists, a photograph is taken for any future comparison needs.
  - If trace evidence is located under the forensic light source, proper documentation and collection will be conducted.
  - The laser relies on internal cooling fans to control the temperature of its components. Set-up the unit away from any heat sources and allow proper clearance for the fan inlet and exhaust ports.
  - The laser is designed to be plugged into a standard AC wall outlet or its internal battery source. A “Battery Status” display on the front panel will indicate charge levels and time remaining, etc.
  - The laser cannot be turned on or operated until the key switch on the controller is in the ON position.
  - A “System Fault” will occur if the internal temperature reaches a maximum value. The laser must be allowed to cool down for 20 minutes before resuming laser operation.
  - Excessive bending of the optical transport fiber will cause an increase in the divergence of the main beam. Kinks or sharp bends may permanently damage the optical fiber.

8 Reflected Ultra-Violet Imaging System (RUVIS)

.01 The Reflected Ultra-Violet Imaging System (RUVIS) is utilized in the Crime Scene laboratory and in the field for the development of latent print evidence and the searching for trace evidence. The RUVIS Imager uses intensified UV reflectance instead of fluorescence for the detection of evidence. The evidence requires basic observations and procedures prior to actual instrumental analyses.

.02 Safety

- Safety guidelines are outlined in the Division Safety Manual and the appropriate operations manual.

.03 Equipment / Materials / Reagents

- Proper safety goggles for 254 nm band or like face shield
- Latex or Nitrile gloves
- Laboratory coat

.04 Standards, Controls, and Calibration

- Quality Control Procedure
  - The RUVIS should be checked for functionality before each use. The appropriate instruction manual may be utilized.
- Maintenance Procedure
  - If the RUVIS is not functioning properly, a supervisor or management should be notified as soon as possible. Only a qualified service technician may repair the instrument.

.05 Operation Procedure

- See the appropriate operations manual for utilizing the RUVIS for evidence analysis. Ensure that operator and those in close proximity wear PPE.
- Use of the RUVIS should be conducted in the FLS room located in the Crime Scene Laboratory.
- If the RUVIS is used outside the FLS room or utilized in the field, ensure that anyone else in the vicinity is outside the operating area and are aware that the RUVIS is in use.
- Take control of the light output beam so that no other person can view the beam directly by accident.

9 Laser Range Meter

.01 The laser range meter is an electronic measuring device utilized in the field for obtaining location measurements of evidence and overall distances required for crime scene sketching. The guidelines detailed below will be followed while using the laser range meter in the field.

.02 Safety

- Safety guidelines are outlined in the Division Safety Manual and the appropriate operations manual.

.03 Quality Control and Maintenance

- The laser range meter should be checked for functionality before each use.
- The laser range meter may be tested if its reliability comes into question.

- The reliability test should be conducted by measuring an established distance of three feet and achieving an accuracy reading within factory standards of 1/16 inch or less.
- A three foot calibrated ruler (National Institute of Standards and Technology certified) will be used to establish the testing distance.

.04 Operating Procedures

- The laser range meter will be operated according to the instruction manual located with the unit, to include:
  - Battery charging level will be maintained at an operating level and batteries will be replaced when deemed appropriate.
  - The meter uses two AA batteries.
  - Target surfaces and lighting conditions will be taken into consideration while obtaining measurements in order to reduce measuring errors.
  - Any damage or malfunction will be reported to a supervisor immediately.

10 Fume Hoods

.01 The fume hoods, when used with proper technique, are effective in reducing the potential for exposure to airborne biological hazards as well as the removal of toxic and noxious fumes. Latent print processing of evidence in the Crime Scene Laboratory should be conducted utilizing the fume hoods.

.02 Quality Control Procedure

- The fume hoods are considered permanent fixtures of the laboratory building. Fume hood performance is monitored by the building services staff.

.03 Maintenance Procedure

- Maintenance issues will be directed to building services staff. Except for routine cleaning, no maintenance will be performed by laboratory staff.

.04 Alarms

- The fume hoods are equipped with alarms to notify employees when the vent hood is not operating properly.
- When an alarm sounds the employee is to take safety steps that may include closing the sash.
- The employee will contact a supervisor or building services staff to address the problem.

.05 Backdraft Vents

- The backdraft vents are not used by laboratory personnel and are designated as inoperable with appropriate signage.

11 Autoclave

.01 The autoclave is used to sterilize solutions, glassware and instruments by subjecting them to high pressure and high heat simultaneously. It may also be used to sterilize biohazard trash prior to discarding.

.02 Quality Control Procedure
- Whenever an item is autoclaved, a small piece of autoclave tape should be adhered to the item. Autoclaves used for both clean and waste items may be cleaned between cycles when alternating from waste to clean items.

.03 Maintenance Procedure
- If the autoclave is not functioning properly, a supervisor or management should be notified immediately. A qualified service technician may repair the equipment.

12 Refrigerator/Freezers

.01 Two refrigerator/freezers are used in the laboratory.
- A Evidence Storage Refrigerator is used for storage of evidence
- A Laboratory Supply Refrigerator is used for storage of reagents and supplies. No non-evidentiary food or beverage items are allowed in the laboratory refrigerators.
- Refrigerator/freezers are generally monitored during working hours to ascertain that they are functioning.

.02 Maintenance Procedure
- Each refrigerator/freezer is maintained in working order and may be repaired or replaced if necessary. The compartments should be kept clean and organized.

13 Thermometers

.01 Thermometers are utilized in the field for the documentation of air, soil or water approximate temperatures regarding various investigations. Thermometers may be verified to ensure the temperature is being accurately measured as appropriate.

.02 Quality Control Procedures
- See Division Standard Operating Procedures

.03 Maintenance Procedures
- Thermometers must be kept clean to facilitate accurate readings.
- A performance verification will be conducted on the thermometer(s) every two years and noted on the Thermometer Performance Verification form.
- If a problem is detected, a supervisor or top management should be notified immediately.

14 Balances/Scales

.01 Laboratory balances are used for measuring chemical ingredients. Analytical balances used in the laboratory may either be calibrated or their accuracy verified against standards as appropriate.

.02 Quality Control Procedure
- See Division Standard Operating Procedures

.03 Maintenance Procedure
- See Division Standard Operating Procedures

15 Cyanoacrylate (CA) Fuming Chambers

.01 The laboratory is equipped with wall mounted fuming chambers. These chambers are to be used for the CA fuming process.

.02 Quality Control Procedure
- The fuming chambers are considered permanent fixtures of the laboratory building. Fuming chamber performance is monitored by the building services staff.

.03 Maintenance Procedure
- If a chamber is not functioning properly, a supervisor or building services staff will be notified as soon as possible to address the problem.

16 Humidity Chamber

.01 The Humidity Chamber is used in conjunction with Ninhydrin and Diazafluoren-one (DFO) processing to accelerate reaction time. The temperatures stated below are suggested for optimum results, but are not critical. When used for DFO processing, the prints need to be observed under a light source for fluorescence. When used with Ninhydrin, any prints present will be visible upon removal from the chamber.

.02 Safety
- Suitably qualified and trained personnel should only use the Humidity Chamber as intended, within its design parameters.
- Normal safety precautions must be taken at all times to avoid the possibility of accidents.
- When the Humidity Chamber is in use, condensation builds up on the door. Caution should be used when opening the door to prevent injury from hot water.
- The Humidity Chamber is sometimes used at temperatures of 100 degrees Celsius. Caution should be used when removing evidence to prevent contact with metal trays.

.03 Quality Control Procedure

- The Humidity Chamber should be visually checked for functionality before each use. The Gallenkamp Humidity Chamber operations manual may be referenced.

.04 Maintenance Procedure

- No maintenance, other than basic cleaning of filters and changing the wick, should be performed by anyone other than a qualified technician.
- If the Humidity Chamber is not functioning properly, a supervisor or management should be notified immediately.

.05 Operation Procedure

- Check that the chamber is connected to the electricity power supply but NOT switched ON at the control panel.
- Check that the water bottle is correctly connected to the chamber water inlet and the pipe has a continuous fall. Fill the bottle with purified water.
- Check the connection of the vent pipe at the rear of the chamber. Exhaust air should be directed to an operating fume cupboard or extraction system. Failure to do so will result in acetic acid or solvent fumes entering the laboratory.
- Check the chamber drain for a correct connection to an open drain or container.
- Check that the interior of the chamber is clean and dry. Cardboard placards may be used under evidence to avoid condensation.
- Prepare and treat evidence with reagent as directed.
- Dry evidence in a fume cupboard to remove excess carrier solvent.
- Commence sequence for chamber start-up.

.06 Chamber Start Up Sequence for Ninhydrin

- Press the POWER rocker switch on the front control panel to ON (illuminated)
- Ensure test selection switch selects the Ninhydrin test.
- Set the **dry** bulb temperature controller (upper of the two controllers) to **80.0** degrees Celsius by doing the following: Press SCROLL key (the display will show SP1 which stands for “set point 1”); Press ENTER; Use up and down arrows to set desired temperature; press ENTER (the display will briefly show “STRD” which stands for “stored”); Press SCROLL key twice until “RUN” is displayed.
- Set the **wet** bulb temperature controller (lower of the two controllers) to **0.0** degrees Celsius by doing the following: Press SCROLL key (the display will show SP1 which stands for “set point 1”); Press ENTER; Use up and down arrows to set desired humidity; press ENTER (the display will briefly show “STRD” which stands for “stored”); Press SCROLL key twice until “RUN” is displayed. This will effectively disable the humidity system.
- Set the safety thermostat to a temperature setting of 90 degrees Celsius.

- The chamber will now proceed to bring the temperature to that set on the dry bulb temperature controller (80.0 C). The reason for starting the chamber with the humidity system disabled is to avoid the possibility of condensation being formed on the chamber's interior surfaces. The prevention of condensation is important. Any drops of condensation formed on the roof of the working chamber may later fall on the test samples.
- Run the chamber in this temperature-only mode for 30 minutes to stabilize the chambers interior temperature. After this period, the humidity system can be introduced.
- Set the **wet** bulb temperature controller (lower of the two controllers) to **70.0** degrees Celsius by doing the following: Press SCROLL key (the display will show SP1 which stands for "set point 1"); Press ENTER; Use up and down arrows to set desired humidity; press ENTER (the display will briefly show "STRD" which stands for "stored"); Press SCROLL key twice until "RUN" is displayed. This set is equivalent to a relative humidity of 65% at 80.0 Celsius.
- Run the chamber in this temperature/humidity mode for 30 minutes to again stabilize the chamber's interior conditions. The temperature may fluctuate approximately 10 or more degrees during processing. This should not affect processing evidence.
- Load the evidence into the chamber as quickly as possible. Always open and close the chamber door slowly so as to avoid unnecessarily disturbing the interior conditions.
- Expose the evidence for the recommended test period (set the countdown timer as required). Remove the evidence after this period and continue as necessary with the fingerprint determination.

.07 Chamber Start Up Sequence for DFO

- Press the POWER rocker switch on the front control panel to ON (illuminated)
- Ensure test selection switch selects the DFO test. This ensures the humidity system is disabled.
- Set the **dry** bulb temperature controller (upper of the two controllers) to **102** degrees Celsius by doing the following: Press SCROLL key (the display will show SP1 which stands for "set point 1"); Press ENTER; Use up and down arrows to set desired temperature; press ENTER (the display will briefly show "STRD" which stands for "stored"); Press SCROLL key twice until "RUN" is displayed.
- Set the safety thermostat to a temperature setting of 110.0 degrees Celsius.
- Run the chamber in this temperature-only mode for 30-45 minutes to stabilize the chamber's interior temperature. The temperature may fluctuate approximately 10 or more degrees during processing. This should not affect processing evidence.
- Load the evidence into the chamber as quickly as possible. Always open and close the chamber door slowly so as to avoid unnecessarily disturbing the interior conditions.

- Expose the evidence for the recommended test period (set the countdown timer as required). Remove the evidence after this period and continue as necessary with the fingerprint determination.

.08 Chamber shut down

- To shut down the chamber, press the POWER rocker switch to OFF (not illuminated). The chamber temperature will slowly drift to ambient. To prevent possible condensation, the chamber door should be left slightly ajar.

.09 Interpretation

- If friction ridge detail becomes evident, it constitutes a positive result. (A light source will be required for DFO examination) If sufficient ridges are apparent and enough detail exists, a photograph is taken for any future comparison needs.

.10 Limitations

- Only for use on porous items.
- Requires a light source for viewing DFO prints.
- Size restrictions regarding items processed..

17 Miscellaneous Equipment

.01 Camera and Video Equipment

- Quality Control Procedure
  - Camera and video equipment will be checked for functionality before each use. The Multi Media Section may be available to assist with the check.
- Maintenance Procedure
  - If the equipment is malfunctioning, a supervisor or management should be notified as soon as possible. The Multi Media Section may be consulted if available.

.02 Trace Evidence Vacuum

- Quality Control Procedure
  - Trace Evidence Vacuum equipment will be checked for functionality before each use.
- Maintenance Procedure
  - If the equipment is malfunctioning, a supervisor or management should be notified as soon as possible.

APPENDIX A ABBREVIATION LIST

The listed abbreviations are approved for **note pages only, with these exceptions (**).**	
All **standard** abbreviations for: thoroughfares, formal titles, measurement, etc. are acceptable for final reports.	
@	at
&	and
#	number
→	follow, at this point
~	about, approximately
>	greater than
<	less than
A	Asian
AA	Atomic Absorption
AB	Amido Black
ABIA	Austin Bergstrom International Airport
a/c	air conditioner
ace	acetone
AD	Ardrox
ADA	Assistant District Attorney
AFD	Austin Fire Department
AFIS	Automated Fingerprint Identification System
agg	aggravated
AI	Accident Investigator
ALS	alternate light source
AM (**)	midnight to noon
ammo	ammunition
aoi	area of impact
APD	Austin Police Department
app	apparent
approx	approximately
apt	apartment
ARF	Analysis Request Form
arr, arvd	arrival, arrived
asslt	assault
ATR	auto theft recovery
Ave	Avenue
B, blk	black

BAC	blood alcohol content
b/c	because
beh	behind
Bldg, blg	building
blk	black, block (based on context)
blu	blue
Blvd.	Boulevard
BMW (**)	Bavarian Motor Works
BNR	Burglary Non-Residence
BOR	Burglary of Residence
BOV	Burglary of Vehicle
BP	Black powder (All Evidence Worksheet abbreviations are approved.)
Brac, Brack	Brackenridge Hospital (University Medical Center Brackenridge)
brn	brown
BS	bloodstain
btl	bottle
b/w, btw, btwn	between
bx	box
c/	containing
CA	Child Abuse, Case Agent (based on context)
CAD	Computer Aided Dispatch
CAE, CA	cyanoacrylate ester
cal	caliber
cart, ctg	cartridge
CD (**)	Compact Disc
CEL	Central Evidence Locker
cell	Cell phone
chk, chks	check(s)
cen, ctr, C	center or central
chevy	Chevrolet
cir	circle, circular
co	company
coll	collision, collected, collection (based on content)
comm	communications
CP	Camphor / Smoke
CPFB	clear plastic fold-top bag
Cpl (**)	Corporal
CPR (**)	cardiopulmonary resuscitation
CPZB	clear plastic zip-top bag

crdbrd	cardboard
crim, CM	criminal, Criminal Mischief
crt	court
CSDR	Crime Scene Drying Room
CSEL	Crime Scene Evidence Locker (Temporary Storage Locker)
CSEV	Crime Scene Evidence Vault
CSL	Crime Scene Laboratory
CSS, CSU	Crime Scene Specialist
CTECC	Combined Transportation Emergency Communications Center
CV	Crystal Violet
cyl	cylinder
DA	District Attorney
dash	dashboard
DCSMS	Digital Crime Scene Management System
dec	decedent
decomp	decomposed, decomposition, decomposing
dep	depart, departed
Dept	Department
Det. (**)	Detective
DF	DFO
di, diw	deionized, deionized water
diff	different
disp	Dispatch, dispatched
dk	dark
dl	driver license, download (based on context)
dmg	damage
DNA (**)	deoxyribonucleic acid
dob	date of birth
dos	dead on scene
DPS	Department of Public Safety
dr, Dr	door, driver, Drive, doctor (based on context)
d/s	driver's side
dw, D/W	deadly weapon
DVD (**)	Digital Video Disk
E	east
eb	eastbound
emp	employee
EC	east central

EMS (**)	Emergency Medical Services
EMT (**)	Emergency Medical Technician
Env, envl, envlp	envelope
ER, ed	emergency room, emergency department
ESDL	Electrostatic Dust Print Lifter
etc	etcetera
evid	evidence
exh	exhibit
ext	exterior
F	female
FAT	Forensic Autopsy Technician
fb, flbd	floorboard
FB	Forensic Building
FBI (**)	Federal Bureau of Investigation
FC	Forensic Center
FCC	fired cartridge case
FLS, FL, FS	forensic light source
fd, f/d	front door
fosb	Fold over sandwich baggie
FP	fluorescent powder, fingerprint
fps	feet per second
frag	fragment
ft, fr, frt	foot, front
FTO	Field Training Officer
f/u	follow up
f/v	family violence
fwd	forward
g	Gram
GB	Gardner-Betts Juvenile Facility, general broadcast
GM or **GMC (**)**	General Motors or General Motors Corporation
GO	General Orders/Lexipol
GPS (**)	Global Positioning System or satellite
grn	green
GSR	gunshot residue
GSW	gunshot wound
GV	Gentian Violet
ha	Hammer

H, hisp	Hispanic
HD	high definition
hom	homicide
hrs	hours
Hwy (**)	Highway
HX	Hemastix or history
ID	identification, identity
ID'd	identified
IF	Iodine Fuming
in	inches
incl	including, included, includes
info	information
inj	injury
int	interior
Inv, I	investigator, investigation (based on context)
JP	Justice of the Peace
juv	juvenile
k	kilo, kilometer (based on context)
kph	kilometers per hour
L (circled)	left
L, lg, lrg	large
lbs (**)	pounds
lf, LF	left front, LIFTS (based on context)
LIMS	Laboratory Information Management System
Ln	Lane
LP (**), lp	license plate (**), latent prints (based on context)
LPP	latent print processing
lps	left passenger side
lr	left rear
lt, **Lt (**)**	left, light, Lieutenant (**) (based on context)
LSA	last seen alive
LTS	left the scene, leaving the scene
LV	Leuco Crystal Violet
M, m	male, meter, medium (based on context)
Mag	Magazine or Magnum (based on context)

MB	MBD
mc	motorcycle
ME	Medical Examiner
med	medium, medication (based on context)
meth	methamphetamine
mfg, mfr	manufacturing, manufacturer
misc	miscellaneous
mm	millimeter
MML	Multi-Media Lab
mod	model
MP	Magna powder
mph	miles per hour
MR	magazine release
MW	magazine well
n, N	no, north (based on context)
N/A	not applicable
nb	northbound
NC	north central
NCIC/TCIC (**)	National Crime Information Center/ Texas Crime Information Center
ne	non-evidentiary, northeast (based on context)
neg	Negative, negative results
NI	Ninhydrin
NLO	No latents observed
NLT	Non-life threatening
noi	no other information
nw	northwest
obv	Obvious, observed
OD	overdose, overdosed
ofc, off	Officer
OL	Oblique lighting
org	orange, organization, organized (based on context)
orig	original, originally, originated
Oz (**)	ounce
pass	passenger
PC, PCT	Property Crime Technician
PD	Physical Developer
pe	Petroleum ether

ph, photo ‘d	photograph, photographed
phone	telephone
pkg, pkgd	package, packaged
p-lot	parking lot
PM (**)	noon to midnight
PO	Police Officer
POCS	Possession of Controlled Substance
poe	point of entry
poi	point of impact
POM	Possession of Marijuana
pos	positive
poss	possible
pov	point of view, personally/privately owned vehicle (based on context)
pox	point of exit
prop	property
p/s	passenger side
pt	patient, point (based on context)
pu, p/u	pickup, pick up
pur	purple
pwd, pwdr	powder
q (overlined)	every
qty	quantity
R (circled)	right
R6G, RH	Rhodamine 6G
RA	RAM
RBS	red brown stain, reddish brown stain
rcvd	received, recovered
Rd (**), rd, r/d	Road, rear door (based on context)
ref	reference
rel	release(d)
repkg, repkgd	repackage, repackaged
req	request
res	residence
rf	right front
robb	robbery
rps	right passenger side
rr	right rear
rt	right

RX	prescription
S	south, small
SA	safety
SAFE	Sexual Assault Forensic Examiner or exam
sb, SB	southbound, Sudan Black (based on context)
SC	south central
SCSS	Senior Crime Scene Specialist
sdn	sedan
SEM	Scanning Electron Microscope
ser	serial, serious (based on context)
sev	severe
Sgt (**)	Sergeant
SL	slide release
sm, sml	small
SN, s/n	serial number, Silver Nitrate (based on context)
spec	specimen
spl	Sample, special (based on context)
SOP	Standard Operating Procedures
SPR	Small Particle Reagent
SS	Southside Wrecker or slide serrations (based on context)
ssn	social security number
SSP	Sticky side powder
St (**)	Street
std	standard
sub	submission, submitted, submit
subs	subwoofers
Sup, sup, supp	Supervisor, supplement (based on context)
susp	suspect
SUV	Sport Utility Vehicle
SW, se	swab(s), southwest, southeast (based on context)
sx	sex, sexual
Tbsp. (**), T.	tablespoon
TCMEO	Travis County Medical Examiner's Office
TCSO	Travis County Sheriff's Office
TD	Titanium dioxide
temp	temporary, temperature (based on context)
TR	trace or trigger (based on context)
TRG	trigger guard

tsp, t	teaspoon
TV	television
TX (**)	The Great State of Texas
UCW	Unlawful Carrying of Weapon
UID	unidentified
unf	unfired
unk	unknown
USB (**)	universal serial bus
UT	University of Texas
utl	unable to locate
UV	Ultraviolet
VCR (**)	Video cassette recorder
Vdex, Vsdx	Versadex
VE	Visual Exam
veh, v	vehicle
VHS (**)	video home system
V/H, VH	Vehicular Homicide
vic	victim
VIN (**)	vehicle identification number
vol	volume
VPF	Vehicle Processing Facility
vs	versus
VW (**)	Volkswagen
W, w, whi	west, white (based on context)
w/	with
wb	westbound
WC	west central
w/o	without
wt	weight
x	times, by
XC	Xerox copy
XLG, XL	extra large
XS	extra small
XXL, XXLG	double-extra large
XXXL; XXXLG	triple-extra large
Y	yes

yd	yard
yel	yellow
yo, yoa	years old, years of age

APPENDIX B LATENT PRINT PROCESSING PROCEDURES

AMIDO BLACK – METHANOL BASE

1 Scope

Amido Black is used to develop latent prints and enhance visible prints that have been deposited in blood. It reacts to the proteins present in blood.

2 Equipment

- Mixing---scales, beakers, graduated cylinder, and magnetic stirrer with stirring bar.
- Application---laboratory squirt bottles.
- Storage--- dark glass bottles.

3 Materials and Chemicals

- Amido Black (naphthol blue black with dye content $\geq$ 85%)
- Glacial acetic acid
- Methanol
- De-ionized water

4 Mixing Procedure

.01 The amido black process consists of two solutions—a developer and a rinse--and a final rinse of De-ionized water.

.02 DEVELOPER SOLUTION

- Amido black……..1 g
- Glacial acetic acid……. 50 mL
- Methanol……450 mL

Combine the ingredients and mix using a stirring device until all the amido black is dissolved. This should take approximately 30 minutes. Store in a dark bottle

.03 RINSE SOLUTION

- Glacial acetic acid……. 50 mL
- Methanol……450 mL

Combine the ingredients and store in a dark bottle.

.04 FINAL RINSE

- De-ionized water is preferred; however, if not available, tap water can be used.

5 Control Procedures

A positive control will be performed on the reagent before every application to ensure its reliability. The reagent will be tested by successfully developing a known blood standard. Successful development will be indicated by a dark blue to black reaction. This control procedure must be documented in the appropriate case notes.

6 Processing Procedure

- Apply the developer to the specimen by dipping or using a squirt bottle.
- Leave the developer on the specimen for approximately 10 seconds to 1 minute (time will vary with the type of surface, porous or non-porous).
- Apply the methanol rinse.
- Apply the final rinse of de-ionized or tap water.
- Allow the specimen to dry.

7 Technical Notes

- Any latent prints will be from light blue to dark blue.
- Preserve by photography with scale.
- Additional processing is acceptable for light prints.
- CA fuming may interfere with this process.
- This process will interfere with CA fuming.
- This technique is not suitable for dark colored surfaces.
- Do not use on painted or varnished surfaces.

8 Preservation

- The preferred method of preservation is photography.
- There have been a few documented cases where the developed blood prints were lifted.

9 Storage

- Store in a dark bottle marked with reagent name and mixture date.
- Solutions are flammable. Store in flammable cabinet.

10 Shelf Life

- References indicate an indefinite shelf life.
- Mixed solution should be tested before using on evidentiary items.

11 Disposal

- Pick up large spill with a solvent package and dispose in airtight container.
- Pick up small spill with absorbent paper. Wrap in several layers of paper and discard.

12 Clean-Up

- Clean mixing material in soap and warm water and then place in dishwasher.
- Surfaces can be cleaned with soap and warm water.

References

- FBI Latent Processing Guide (2000).
- Texas DPS Student Handout "Amido Black" T-59 (1988)

AMIDO BLACK – WATER BASE—FISCHER 98

1 Scope

This Amido black water-based formula is a one-step process that includes a blood fixer. The sensitivity and color intensity of the process are similar to that of the Amido black methanol-based formula. This process uses a tap water rinse. As with the methanol based reagent, Amido Black reacts to the proteins present in blood.

2 Equipment

- Mixing--scales, beakers, graduated cylinder, magnetic stirrer with stirring bar.
- Application---lab squirt bottle
- Storage---dark storage bottle

3 Materials and Chemicals

- Glacial acetic acid
- Formic acid (concentrated)
- Amido black (Naphthol blue black with dye content $\geq$ 85%)
- Photo-Flo™ 600 solution
- Sodium carbonate
- 5-Sulfosalicylic acid (purity $\geq$ 99%)

4 Mixing Procedures

Amido black water-based one-step formula is prepared on a stirring device by combining the ingredients in the order that they are listed.

- De-ionized water……..250 mL
- 5-Sulfosalicylic acid…… .10 g
- Amido black 1.5 g
- Sodium carbonate 1.5 g
- Formic acid 25 mL
- Glacial acetic acid 25 mL
- Photo-Flo™ 600 solution 6.25 mL

Dilute this mixture to 500 mL using de-ionized water. Although this mixture will be ready to use following dilution, allow the mixture to stand for several days prior to use for best results.

5 Control Procedures

A positive control will be performed on the reagent before every application to ensure its reliability. The reagent will be tested by successfully developing a known blood standard. Successful development will be indicated by a dark blue to black reaction. This control procedure must be documented in the appropriate case notes.

6 Processing Procedure

- Apply working solution to specimen by dipping or using a squirt bottle.
- Leave solution on the specimen for 3 to 5 minutes.
- Rinse with tap water.

7 Technical Notes

- This solution is used on painted or varnished surfaces
- This solution includes a blood fixer.
- Any latent or visible prints will be from light blue to dark blue
- Preserve any images with photography and scale.
- Additional processing is acceptable for light prints.
- CAE fuming may interfere with this process.
- This process will interfere with CAE fuming.
- This technique is not suitable for dark colored surfaces.

8 Storage

- Store in a dark bottle marked with reagent name and mixture date.
- Solution is a weak acid. Store in acid cabinet.

9 Shelf Life

- References indicate an indefinite shelf life.
- Mixed solution should be tested before using on evidentiary items.

10 Disposal

- Pick up large spill with an acid package and dispose of as described on spill kit.
- Pick up small spill with absorbent paper. Wrap in several layers of paper and discard.
- Excess solution will be poured in waste container marked for acids.

11 Clean-Up

- Clean mixing material in soap and warm water and then place in dishwasher.
- Surfaces can be cleaned with soap and warm water.

References

- FBI Latent Processing Guide (2000)

CA (CYANOACRYLATE) FUMING - FUMING WAND

1 Scope

CA fuming is used to develop latent prints on non-porous and semi-porous items as it polymerizes with moisture and sebaceous oils in the latent print residue and appears as white to almost translucent.

2 Equipment

- Fuming chamber OR enclosed area to seal in fumes
- Fuming wand with butane fuel cylinder

3 Material and Chemicals

- Cyanoacrylate fuming cartridges
- Warm to almost hot water (Optional)

4 Processing Procedure

.01 Filling the fuming wand fuel cylinder.

- Ensure that the fuming wand is in the OFF position and is cool.
- Hold the fuming wand with its tip downward so the refill nozzle will be in the upward position.
- Press the nozzle of butane fuel cylinder downward into the center of the fuming wand gas refill nozzle and apply firm pressure.
- When full, the butane fuel will vent through the refill valve.
- Examine the fuel level through the gas level window. Clear liquid will be visible.

.02 Starting the fuming wand.

- Place a fuming cartridge on the hot air tip.
- Set the control lever to the number 3 position (midway).
- Slide the ON/OFF switch to its ON position (to the right).
- The sound of escaping butane may be audible.
- Slowly press and hold the ignition button for a period of three seconds, then slowly release. A whistling sound may become audible. A red glow should be visible when looking into view window near the tip of the wand.
- If the wand has not ignited, repeat this step.

.03 Working the fuming wand

- A dense stream of hot Cyanoacrylate vapors will begin to emerge within a minute of ignition.
- Hold the fuming wand six to nine inches from the target area and slowly sweep the vapor stream over the surface.
- Do not use the wand directly on surfaces, which are easily deformed by heat.
- Over development is likely if the wand is held too close or too long over a area.

- Under development is likely if the wand is held too far away or not very long over the target area.
- Uneven development is likely caused by failure to maintain an even flow of vapors across the print area.
- View the item(s) for latent prints. The fuming process can be repeated.

.04 Removing the Cyanoacrylate cartridge

- Turn the fuming wand off by sliding the ON/OFF switch fully to the left.
- Place the extraction tool over the cartridge such that the cartridge neck extends between the wrench jaws and the metal clip extends over the top of the cartridge.
- Remove the cartridge by slowly pulling the cartridge away from the wand.
- Place the spent cartridge on a surface capable of withstanding high temperatures and allow to cool.

5 Control Procedures

A positive control will be performed on the reagent before every application to ensure its reliability. The reagent will be tested by successfully developing a known fingerprint standard. Successful development will be indicated by an opaque white reaction. This control procedure must be documented in the appropriate case notes.

6 Technical Notes

- CA fuming will work best if the humidity is between 70% to 80%. Humidity can be added to enclosed areas by the introduction of warm to hot water.
- CA fuming is best when the items are lightly fumed.
- All openings of a firearm should be covered before fuming.
- CA fuming may impair blood print enhancement techniques.
- Use exhaust fan or respiratory protection when instrument is in an occupied room.
- Avoid dropping or a hard blow to the wand as the ceramic burner may be damaged.
- Only refill with Butane and do not store near flame, furnaces, or heaters.
- Do not store in sunlight or where the wand is exposed to heat in excess of 104° F.
- Use only Butane fuel. Never use alcohol, propane or other fuels.

7 Preservation

- CA fumed latent prints can be photographed (generally color reversed).
- CA fumed latent prints can be dusted with powder and then lifted.
- CA fumed latent prints can be dye stained for fluorescent photography.

8 Storage

- Fuming wands and fuel are to be stored in a cool area.
- Fuming cartridges are to be stored in container until ready to use.

9 Shelf Life

- Indefinite for Cyanoacrylate Fuming Cartridges if kept from heat.
- Equipment life only for Fuming Wand.

10 Disposal

- Wrap spent Cyanoacrylate Fuming Cartridges in paper after they have cooled and discard in waste receptacle.
- Spent butane fuel cans to be wrapped in several layers of paper and discard in waste receptacle.

11 Clean-Up

- Acetone may be used to dissolve small amounts of glue from unwanted surfaces.

References

- FBI Latent Processing Guide (2000)
- Sirchie Fingerprint Laboratories Technical Information (TI3123/ENO186)--(1994).

CA (Cyanoacrylate) Fuming - Gel Pack

1 Scope

CA fuming is used to develop latent prints on non-porous and semi-porous items as it polymerizes with moisture and sebaceous oils in the latent print residue and appears as white to almost translucent.

2 Equipment

- Fuming chamber with water container.

3 Material and Chemicals

- Cyanoacrylate in a gelatin and sealed in an aluminum package.
- Warm to almost hot water.

4 Processing Procedure

- Load the fuming chamber with those items to be processed and close any vents.
- Place warm to hot water in a container at the opposite end of the fuming chamber.
- With the Cyanoacrylate package at room temperature open it and secure to one side of chamber or lay on base of chamber with gelatin surface up.
- Fume the items. Fuming time can vary depending on the size of the chamber, the number of items being fumed and the humidity present in the chamber. A five square foot chamber will take from 30 to 60 minutes.
- After fuming open any vents and allow 10 minutes for the chamber to vent.
- Remove the Cyanoacrylate gelatin pack and seal in a zip top plastic bag.
- Remove items from the chamber to view for latent prints. If necessary, the fuming process can be repeated.

5 Control Procedures

A positive control will be performed on the reagent before every application to ensure its reliability. The reagent will be tested by successfully developing a known fingerprint standard. Successful development will be indicated by an opaque white reaction. This control procedure must be documented in the appropriate case notes.

6 Technical Notes

- CA fuming will work best if the chamber has between 70% to 80% humidity.
- CA fuming is best when the items are lightly fumed.
- When placing items in chamber prior to fuming, allow ½ inch between items and the walls of the chamber.
- Small plastic items should be hung from a cross support.
- In large chambers spot processing can be avoided with the use of a fan.
- All openings of a firearm should be covered before fuming.
- CA fuming may impair blood print enhancement techniques.

7 Preservation

- CA fumed latent prints can be photographed (generally color reversed).
- CA fumed latent prints can be brushed with latent print powder and then lifted.

- CA fumed latent prints can be dye stained for fluorescent photography.

8 Storage

- Opened gelatin packs must be secured in a zip lock type plastic bag.
- Opened and unopened gelatin packs should be stored in a refrigerator.

9 Shelf Life

- Opened gelatin packs are usually good for 6 months.
- Unopened gelatin packs are indefinite.

10 Disposal

- Opened and dry gelatin packs should be wrapped in several layers of paper and discarded in waste receptacle.

11 Clean-Up

- Acetone may be used to dissolve small amounts of glue from unwanted surfaces.
- Scraping with sharp blades can clean fuming chamber glass.
- **Do not use bleach or other oxidizers to clean up Cyanoacrylate.**

References

- FBI Latent Processing Guide (2000)

CA (CYANOACRYLATE) FUMING - HEAT ACCELERATION

1 Scope

CA Fuming is used to develop latent prints on non-porous and semi-porous items as it polymerizes with moisture and sebaceous oils in latent print residue and appears as white to almost translucent.

2 Equipment

- Fuming chamber with water container.
- Heater (coffee warmer) with aluminum dish.

3 Materials and Chemicals

- Cyanoacrylate.
- Warm to almost hot water.

4 Processing Procedure

- Load the fuming chamber with those items to be processed and close any vents.
- Inside the fuming chamber turn on the heating element and allow to heat up for 5-10 minutes.
- Place the aluminum dish on the heating element.
- Place warm to hot water in a container at the opposite end of the fuming chamber.
- Place the Cyanoacrylate in the aluminum dish (10 drops per 5 square feet of space).
- Fume the items. Fuming time can vary depending on the size of the chamber, the number of items being fumed and the humidity present in the chamber. A five square foot chamber will take from 5 to 20 minutes.
- After fuming, turn off the heating element. Open the chamber and allow 10 minutes for the chamber to vent. Do not open the chamber door to vent the chamber.
- Remove items from the chamber to view for latent prints. If necessary, the fuming process can be repeated.

5 Control Procedures

A positive control will be performed on the reagent before every application to ensure its reliability. The reagent will be tested by successfully developing a known fingerprint standard. Successful development will be indicated by an opaque white reaction. This control procedure must be documented in the appropriate case notes.

6 Technical Notes

- CA fuming will work best if the chamber has between 70% to 80% humidity.
- When placing items in chamber prior to fuming, allow ½ inch between items and the walls of the chamber.
- Small plastic items should be hung from a cross support.
- In large chambers spot processing can be avoided with the use of a fan.
- All openings on a firearm should be covered before fuming.
- CA fuming may impair blood print enhancement techniques.

7 Preservation

- CA fumed latent prints can be photographed (generally color reversed)
- CA fumed latent prints can be dusted with powder and then lifted.
- CA fumed latent prints can be dye stained for fluorescent photography.

8 Storage

- Small plastic bottles can be stored at room temperature.
- Large plastic bottles should be stored in the refrigerator.

9 Shelf Life

- Indefinite for Cyanoacrylate liquid.

10 Disposal

- Wrap excess in several layers of paper and discard in waste receptacle.

11 Clean-Up

- Acetone may be used to dissolve small amounts of glue from unwanted surfaces.
- Use hot water and a scrub sponge to clean fuming chamber glass and interior surfaces. Scraping with sharp blades can clean stubborn residue on the fuming chamber glass.
- **Do not use bleach or other oxidizers to clean up Cyanoacrylate**.

References

- FBI Latent Processing Guide (2000)

CA FLUORESCENT DYE - ARDROX

1 Scope

This formula is used to dye Cyanoacrylate developed latent prints. These prints can then be better visualized by the use of a laser or forensic light source (FLS). This method is effective on all colors of non-porous surfaces.

2 Equipment

- Mixing---Scales, beakers, graduated cylinders.
- Application---Squirt bottle or sprayer, glass tray, forensic light source (FLS).
- Storage---Dark bottles.

3 Materials and Chemicals

- Ardrox P133D
- Acetone
- Methanol
- Isopropanol
- Acetonitrile
- Petroleum ether

4 Mixing Procedure

.1 Ardrox dye stain does not use a stock solution. Ardrox is used undiluted directly from the container.

.2 Working Solution

- Ardrox P133 D……. 1 ml
- Acetone…….. 5 ml
- Methanol……. 12.5 mL
- Isopropanol……. 5 mL
- Acetonitrile…….. 4 mL
- Petroleum ether……. 470 mL

Combine the ingredients in the order listed. Do not place on a magnetic stirrer.

5 Control Procedures

A positive control will be performed on the reagent before every application to ensure its reliability. The reagent will be tested by successfully developing a known fingerprint standard. Successful development will be indicated by a yellow reaction. This control procedure must be documented in the appropriate case notes.

6 Processing Procedure

- After the specimen has been processed with Cyanoacrylate (CA) fuming, Ardrox can be applied by spraying, dipping, or using a squirt bottle, followed by examination under a forensic light source (FLS).

7 Technical Notes

- This process only works in combination with CA fuming.
- Use a methanol rinse if fluorescence is too bright.
- Barrier filters and goggles must be used to observe fluorescent latent print.

8 Preservation

- CA fluorescent dyed latent prints must be photographed.

9 Storage

Clear or dark bottles.

10 Shelf Life

- Working solution……up to 6 months.

11 Disposal

- Excess Ardrox working solution is to be discarded in waste container marked flammable.

12 Clean-Up

- Use a solvent clean up package to contain spilled Ardrox working solution.

References

- FBI Latent Processing Guide (2000)

CA FLUORESCENT DYE - MBD

1 Scope

MBD is a fluorescent dye used to make Cyanoacrylate developed latent prints more visible on various colored surfaces. A laser or forensic light source (FLS) is used in conjunction with this process.

2 Equipment

- Mixing---Scales, beakers, graduated cylinders, magnetic stirrer with bar.
- Application---Squirt bottle or sprayer, glass tray, forensic light source (FLS).
- Storage---Dark bottles.

3 Materials and Chemicals

- MBD
- Acetone
- Methanol
- Isopropanol
- Petroleum ether

4 Mixing Procedure

.01 MBD is mixed in stock and working solutions.

.02 Stock Solution

- MBD……. 1 g
- Acetone…… 1000 mL

Combine the ingredients and stir on a stirring device until all the MBD is dissolved.

.03 Working Solution

- MBD Stock Solution……. 5 mL
- Methanol……. 15 mL
- Isopropanol……. 5 mL
- Petroleum ether…….. 475 mL

Combine the ingredients in the order listed.
<u>Do not place on a magnetic stirrer.</u>

5 Control Procedures

A positive control will be performed on the reagent before every application to ensure its reliability. The reagent will be tested by successfully developing a known fingerprint standard. Successful development will be indicated by an orange reaction. This control procedure must be documented in the appropriate case notes.

6 Processing Procedure

The MBD working solution can be applied by dipping or using a squirt bottle. This solution is applied to the specimen(s) after the Cyanoacrylate fuming process and then examined under a laser or forensic light source (FLS).

7 Technical Notes

- This process only works in combination with CA fuming.
- Use a methanol rinse if fluorescence is too bright.
- Barrier filters and goggles must be used to observe fluorescent latent print.

8 Preservation

- CA fluorescent dyed latent prints must be photographed.

9 Storage

- Clear or dark bottles.

10 Shelf Life

- Stock solution…… Indefinite
- Working solution……up to 6 months.

11 Disposal

- Excess MBD working solution is to be discarded in waste container marked flammable.

12 Clean-Up

- Use a solvent clean up package to contain any spilled working solution.

References

- FBI Latent Processing Guide (2000)

CA FLUORESCENT DYE - RAM

1 Scope

This formula is used to dye Cyanoacrylate developed latent prints. These prints can then be better visualized by the use of a laser or forensic light source (FLS). This method is effective on all colors of non-porous surfaces.

2 Equipment

- Scales, beakers, graduated cylinder, magnetic stirrer with bar for mixing.
- Squirt bottle or sprayer, glass tray, forensic light source (FLS) for application.
- Dark bottles for storage.

3 Materials and Chemicals

- Rhodamine 6G (dye content 99%)
- MBD
- Ardrox P133D
- Methanol
- Isopropanol
- Acetonitrile
- Petroleum ether
- Acetone

4 Mixing Procedure

.01 Two stock solutions must be mixed prior to formulating the RAM dye.

.02 Stock Solution 1 (Rhodamine 6G)
Rhodamine 6G……1 g
Methanol……1000 mL
Combine the ingredients and place on a stirring device until all the Rhodamine 6G is thoroughly dissolved.

.03 Stock Solution 2 (MBD)
MBD……..1 g
Acetone……..1000 ml
Combine the ingredients and place on a stirring device until all the MBD is thoroughly dissolved.

.04 Stock Solution 3 (Ardrox P133D)
Ardrox is used undiluted directly from the container

.05 RAM Working Solution

Combine the ingredients in the order listed. Do not place on a magnetic stirrer.
Stock Solution 1 (Rhodamine 6G Stock)…… 1.5 mL
Stock Solution 3 (Ardrox P133D Stock)…… 1.0 mL

Stock Solution 2 (MBD Stock)……	3.5 mL
Methanol……	10 mL
Isopropanol……	5 mL
Acetonitrile……	4 mL
Petroleum ether……..	475 mL

5 Control Procedures

A positive control will be performed on the reagent before every application to ensure its reliability. The reagent will be tested by successfully developing a known fingerprint standard. Successful development will be indicated by an orange reaction. This control procedure must be documented in the appropriate case notes.

6 Processing Procedure

- After the specimen has been processed with Cyanoacrylate (CA) fuming, RAM can be applied
- By spraying, dipping, or using a squirt bottle, followed by examination under a forensic light source (FLS).

7 Technical Notes

- This process only works in combination with CA fuming.
- Use a methanol rinse if fluorescence is too bright.
- Barrier filters and goggles must be used to observe fluorescent latent print.

8 Preservation

- CA fluorescent dyed latent prints must be photographed.

9 Storage

- Rhodamine 6G Stock, MBD Stock, and RAM working solutions must be stored in dark glass bottles.
- Rhodamine 6G Stock, MBD Stock, and RAM working solution must be stored in a flammable cabinet.

10 Shelf Life

- Stock Solution 1 (Rhodamine 6G)--------Indefinite
- Stock Solution 2 (MBD)---------- Indefinite
- Ardrox P133D Working----------Indefinite
- RAM working solution----------stable for approximately 30 days (After 30 days, check solution for separation. If separated, shake vigorously and return to suspension. If this does not occur, the solution will be discarded.)

11 Disposal

- Excess RAM working solution is to be discarded in waste container marked flammable.

12 Clean-Up

- Use a solvent clean up package to contain spilled Rhodamine 6G stock, MBD stock, and RAM working solutions.
- Spilled Rhodamine 6G and MBD powder can be wrapped in several layers of paper and placed in waste receptacle.

References

- FBI Latent Processing Guide (2000)

CA FLUORESCENT DYE - RHODAMINE 6G

1 Scope

Rhodamine 6G is a fluorescent dye used to make Cyanoacrylate developed latent prints more visible on various colored surfaces. A laser or forensic light source (FLS) is used in conjunction with this process.

2 Equipment

- Mixing---Scales, beakers, graduated cylinders, magnetic stirrer with bar.
- Application---Squirt bottle or sprayer, glass tray, forensic light source (FLS).
- Storage---Dark bottles.

3 Materials and Chemicals

- Rhodamine 6G (dye content $\geq$ 99%)
- Acetone
- Methanol
- Isopropanol
- Petroleum ether
- Acetonitrile

4 Mixing Procedure

.01 The Rhodamine 6G process uses stock and working solutions.

.02 Stock Solution

- Rhodamine 6G…….. 1 g
- Methanol…… 1000 mL

Combine the ingredients and place on a stirring device until all the Rhodamine 6G is dissolved.

.03 Working Solution

- Rhodamine 6G stock solution…….. 3 mL
- Acetone…… 15 mL
- Acetonitrile ……. 10 mL
- Methanol…….. 15 mL
- Isopropanol…… 32 mL
- Petroleum ether…… 925 mL

Combine the ingredients in the order listed. Do not place on a magnetic stirrer.

5 Control Procedures

A positive control will be performed on the reagent before every application to ensure its reliability. The reagent will be tested by successfully developing a known fingerprint standard. Successful development will be indicated by an orange reaction. This control procedure must be documented in the appropriate case notes.

6 Processing Procedure

The Rhodamine 6G working solution can be applied by dipping or using a squirt bottle. This solution is applied to the specimen(s) after the Cyanoacrylate fuming process and then examined under a laser or forensic light source (FLS).

7 Technical Notes

- This process only works in combination with CA fuming.
- Use a methanol rinse if fluorescence is too bright.
- Barrier filters and goggles must be used to observe fluorescent latent print.

8 Preservation

- CA fluorescent dyed latent prints must be photographed.

9 Storage

- dark bottles.

10 Shelf Life

- Stock solution…….. indefinite
- Working solution……up to 6 months.

11 Disposal

- Excess Rhodamine 6G working solution is to be discarded in waste container marked flammable.

12 Clean-Up

- Use a solvent clean up package to contain any spilled working solution.

References

- FBI Latent Processing Guide (2000)

DFO (1,8-DIAZAFLUOREN-9-ONE)

1 Scope

DFO is used to develop latent prints on porous surfaces. DFO reacts with the amino acids in perspiration. When this reaction is complete, the developed latent prints will fluoresce with the use of a laser or a forensic light source (FLS).

2 Equipment

- Mixing--scales, graduated cylinder, magnetic stirrer with stirring bar.
- Application---glass tray, sprayer or squirt bottle, and forensic light source (FLS).
- Storage---dark bottle.

3 Materials and Chemicals

- DFO
- Methanol
- Ethyl acetate
- Glacial acetic acid
- Petroleum ether

4 Mixing Procedure

.01 DFO is mixed in two solutions---stock and working.

.02 DFO Stock Solution

- DFO……. 500 mg
- Methanol……. 100 mL
- Ethyl acetate…… 100 mL
- Glacial acetic acid…… 20 mL

Combine the ingredients and place on a stirring device for approximately 20 minutes until the DFO is dissolved.

.03 DFO Working Solution

Dilute the stock solution to 1 L with petroleum ether. The working solution should be a clear gold color.

5 Control Procedures

A positive control will be performed on the reagent before every application to ensure its reliability. The reagent will be tested by successfully developing a known fingerprint standard. Successful development will be indicated by a pink reaction. This control procedure must be documented in the appropriate case notes.

6 Processing Procedure

Items can be dipped in a solution of DFO, or the DFO can be applied to the item when it is in a glass tray using a lab squirt bottle. When a specimen (item) has been processed with DFO, it must be dried and placed in the Humidity Chamber on the DFO setting - at approximately 102°C (212°F) - for between 10 and 15 minutes. If the humidity chamber

is not available, a dry iron may be used (if a steam iron is used it must have the steam turned off) for approximately 20 minutes.

7 Technical Notes

- The addition of humidity to an item processed with DFO will cause any images to lose their fluorescence.
- DFO reaction will be light pink in color in visible light and fluoresce white under a Forensic Light Source (FLS).
- DFO must be used prior to Ninhydrin, Physical Developer, or Silver Nitrate.
- Items processed with DFO after Ninhydrin will not fluoresce.
- It has been documented that DFO used before Ninhydrin will cause some Ninhydrin latent prints to improve in contrast and density.
- May cause some inks to run.
- Yellow legal pad paper fluoresces best at 570 to 590 nm with a red filter.

8 Preservation

- DFO developed latent prints can only be preserved by photography.

9 Storage

- DFO reagent must be stored in clean dark glass bottle.
- DFO reagent is flammable and must be stored in a flammable cabinet.

10 Shelf Life

- DFO stock solution……..more than 6 months.
- DFO working solution…….more than 6 months.

11 Disposal

- DFO stock and working solutions must be discarded in a flammable waste container.

12 Clean-Up

- Small amounts of DFO powder may be wrapped in paper and discarded in waste receptacle.
- Use flammable spill kit to clean up accidental spills of DFO stock and working solutions.

References

- FBI Latent Processing Guide (2000)
- Sirchie Fingerprint Labs

FINGERPRINT POWDERS

1 Scope

Powdering is the application of finely ground, colored powder to a non-porous surface to make latent prints visible under normal light or by fluorescence by a Forensic Light Source (FLS). Powder clings to moisture, oil, and other residues.

2 Equipment

- Fiberglass filament brush, camel-hair brush, or feather duster.
- Magna brush wand.

3 Materials and Chemicals

- Conventional powders----black, gray, silver, white, dual contrast
- Fluorescent powders----red, green, pink
- Magnetic powders---black, gray, silver, red, green

4 Mixing Procedure

- Premixed

5 Processing Procedure

.01 Conventional Powders

- Open container for use OR pour needed amount of powder into a small pile.
- Dip tip of bristles of brush into powder then tap brush to remove excess powder.
- Apply a small amount of powder onto the surface and begin to brush.
- Brush in the direction of any ridges that begin to appear.
- Build powder onto ridges and stop when latent print reaches point of sufficient clarity.
- Clean excess powder from between ridges using a brush.

.02 Fluorescent Powders

- With powder container closed securely, flip container upside down, then turn right side up. Tap container on counter. Remove lid.
- Using a brush designated for the specific powder (if available), dip tip of bristles of brush into powder residue on interior of lid.
- Working under a Forensic Light Source (FLS), apply a small amount of powder onto the surface and begin to brush.
- Brush in the direction of any ridges that begin to appear.
- Build powder onto ridges but be careful not to add too much to background as the fluorescence will overwhelm the clarity of the latent print.
- Clean excess powder from between ridges using a clean brush, if needed.

.03 Magnetic Powders

- Place magna brush wand with magnet engaged into container of magnetic powder. This will produce a bristle-like effect at the end of the wand when withdrawn.
- Apply in a circular motion to the surface being examined. Make sure that only the magnetic powder touches the surface, not the wand.
- After the print has been developed, hold the wand over the container and withdraw the control rod. This will disengage the magnet and release the powder.
- Re-engage the magnet and pass the clean wand over the developed latent print and the surrounding area to remove excess powder. Do not touch the surface.

6 Technical Notes

- Powder works best on dry non-porous surfaces. Do not use on moist or wet surfaces as any latent prints may be destroyed.
- If powder seems to become weak over time, discard and obtain new powder.
- Stiff brushes are used primarily for cleaning the area between the ridges.
- Too much pressure from a brush may wipe a latent print from the surface.

7 Preservation

- Conventional and magnetic powder may be lifted and transferred to a contrasting card.
- Conventional and magnetic powder may be photographed prior to lifting.
- Fluorescent powders must be photographed prior to lifting.

8 Storage

- Store in original container.
- Store in powder cabinet or in processing kits.

9 Shelf Life

- Indefinite if kept dry. Moisture can cause powder to become lumpy.
- Continued use can cause magnetic powder to become weak.

10 Disposal

- Excess can be collected, wrapped in paper and discarded in waste receptacle.

11 Clean-Up

- On non-porous surfaces soap, water or spray cleaners can be used and surface wiped down.
- On porous surfaces, vacuum first and then industrial cleaner should be used.

References

- FBI Latent Processing Guide (2000)

FLAME OR BLACK SOOT

1 Scope

This process is used on dried oily prints such as on weapons, tools, or galvanized metals. It is used by igniting certain materials like camphor blocks or tape that, when burning, will produce a black soot residue that coats a surface when passed through the apex of the flame. This residue is then brushed off with a soft bristle type brush revealing latent prints. The latents can then be lifted with lifting tape. If white soot is needed for dark surfaces magnesium strips can be used. In a case with the evidence being submitted as the result of arson, the evidence may already have a coating of soot on the surface.

2 Equipment

- Pyrex dish
- Soft bristle brush (short hair, fiberglass)
- Lifting tape

3 Materials and Chemicals

- Camphor blocks
- Masking tape
- Magnesium strips

4 Processing Procedure

.01 Camphor blocks or Magnesium Strips

- Place several small blocks or strips in a Pyrex dish.
- Ignite.
- Pass object through apex of flame until surface is coated.
- Brush off soot.
- Let surface cool.
- Lift latents.

.02 Masking Tape

- Remove a length of tape from the roll.
- Twist the tape into the form of a loosely rolled stick and ignite the tape.
- Pass the object through the apex of flame until surface is coated.
- Brush off soot and lift any developed latents.

5 Technical Notes

- Caution should be used as to not get the surface too close to the flame.
- The heat will cause prints to evaporate if they contain mostly moisture.
- Not to be used on porous surfaces.

6 Preservation

- The preferred method of preservation is photography and/or lifting.

7 Storage

- Store according to manufacturer specifications

8 Shelf Life

- References indicate an indefinite shelf life.
- Process should be tested before using on evidentiary items.

9 Disposal

- Ensure that all flames are extinguished with water and safe for disposal.
- Debris from process can be disposed of in trashcans once safe for disposal.

10 Clean-Up

- Clean mixing material in soap and warm water and then place in dishwasher.
- Surfaces can be cleaned with soap and warm water.

References

- Book Titled: Fingerprint Techniques, by Andre A. Moenssens.
- Article Titled: The Use Of Flame In The Development Of Latent Prints, by Major Joseph J. Corr, Jr. USAREUR.

GENTIAN VIOLET - CRYSTAL VIOLET

1 Scope

Gentian Violet is used to develop latent prints on the adhesive side of tape and stains the epidermal cells a purple or light violet color.

2 Equipment

- Scales
- Beakers
- Magnetic stirrer with stirring bar
- Glass tray
- Dark storage bottle

3 Materials and Chemicals

- Gentian Violet
- De-Ionized Water

4 Mixing Procedure

- Gentian Violet…….. 1 g
- De-Ionized water……. 1000 ml

Combine the ingredients and place on a stirring device for approximately 30 minutes.

5 Control Procedures

A positive control will be performed on the reagent before every application to ensure its reliability. The reagent will be tested by successfully developing a known fingerprint standard. Successful development will be indicated by a purple reaction. This control procedure must be documented in the appropriate case notes.

6 Processing Procedure

Gentian violet is applied by dipping. Pour solution into a glass tray. Place the specimen(s) in the gentian violet solution for approximately 1 to 2 minutes, then rinse in cold tap water.

7 Technical Notes

- The gentian violet solution can be reused.
- Any latent prints will be light to dark violet color.
- Preserve by photography with scale.
- Photograph with adhesive side of tape facing up.
- Additional processing is acceptable for light contrast latent prints.
- Dry tape items and secure on clear plastic sheets.
- This technique may interfere with other processing techniques.
- Heavy background staining may occur with cloth or paper types of tape.

8 Storage

- Store in a dark bottle marking the date when the solution was prepared.

9 Shelf Life

- Although listed as indefinite, new solution should be mixed once a year.

10 Disposal

- Small amounts of powder may be wrapped in paper and discarded.
- Weakened or year old solution will be poured in properly marked waste container.

12 Clean-Up

- Use soap and water for surfaces.
- Strong solution of water and bleach (2 to 1) will lessen color intensity.

References

- FBI Latent Processing Guide (2001)

IODINE FUMING

1 Scope

Iodine fuming is used to develop latent prints on porous surfaces as it adheres to grease or oils and will appear in color from yellow to dark brown.

2 Equipment

- Fuming chamber, ceramic or glass dish, heat source.
- Disposable fuming gun.
- Plastic bag large enough to hold item and able to seal contents.

3 Material and Chemicals

- Iodine crystals (ACS reagent grade).

4 Mixing Procedures

- Not applicable--Use as Needed.

5 Control Procedures

A positive control will be performed on the reagent before every application to ensure its reliability. The reagent will be tested by successfully developing a known fingerprint standard. Successful development will be indicated by a brownish reaction. This control procedure must be documented in the appropriate case notes.

6 Processing Procedure

.01 Disposable Fuming Gun

- Remove the fuming gun from the plastic bag – retain the bag for disposal of the used fuming gun.
- The ampoule containing iodine crystals will be visible inside the fuming gun. Grasp the fuming gun in the palm of your hand and cover the area where the crystals are located for at least one minute. Body heat will accelerate sublimation of the crystals.
- Open the stopper cap on the front end of the fuming gun.
- Attach the Blowing Tube to the Red Cap at the other end.
- Crush the enclosed glass ampoule by squeezing between the thumb and forefinger.
- Aim the nozzle (front end) of the tube toward the area to be fumed. The nozzle-to-surface distance should not exceed one inch.
- Extend the Blowing Tube to its full length, take a deep breath, place the end between your lips, and blow steadily. As the breath warms the crystals, a purple vapor may be seen coming from the nozzle. Move the nozzle across the surface in a sweeping circular motion. <u>Do not inhale through the blowing tube!</u>
- Faint prints can be re-fumed.
- Photograph developed prints immediately.

.02 Modified Fuming Chamber

- Place crystals or Iodine saturated silica pack in bottom of zip lock plastic bag.
- Place specimen in zip lock bag.
- Apply heat from hands or heat lamp to sublime crystals into a vapor.

.03 Fixing the Iodine Developed Latent

- Iodine developed latent prints will disappear after a short period of time.
- Steam will sometimes fix a latent if the paper has starch in it.
- Spray starch will fix an iodine developed latent print.
- Fixed iodine latent prints will appear from light violet to dark purple in color.
- Fixing iodine prints may interfere with other development processes.

7 Technical Notes

- Iodine will not generally work on latents older than four weeks.
- Iodine fuming should not be used on any metal surfaces.
- Iodine crystals coming into contact with specimens may burn the surface of the item.

8 Preservation

- Iodine fumed prints must be photographed.
- Iodine fumed prints on soft surfaces may be lifted with a clean silver plate and exposed to light for development.

9 Storage

- Iodine crystals in a dark brown bottle with a plastic lid.

10 Shelf Life

- Iodine crystals---indefinite

11 Disposal

- Small amounts of iodine crystals may be wrapped in several layers of paper and discarded in waste receptacle.
- Large amounts should be treated as a caustic material.
- Zip-Lock bag may be wrapped in paper and discarded in waste receptacle.
- After use, close the Stopper Cap and tie a knot in the Blowing Tube of the Disposable Fuming Gun. Put the Gun into a plastic bag, tape it shut and dispose into a waste receptacle.

12 Clean-Up

- Stained areas will slowly fade in a short period of time.
- Regular soap and water may cause the stain to fix and turn a darker purple.

References

- FBI Latent Processing Guide (2000)
- Sirchie Finger Print Laboratories Technical Information for Fumette Disposable Iodine Fuming Gun No. DF2016

LCV (LEUCOCRYSTAL VIOLET)

1 Scope

LCV is used to enhance visual prints and develop latent prints, which are deposited in blood. The color reaction is from a light pink to a purple. LCV reacts with the enzymes present in blood.

2 Equipment

- Scales, beakers, magnetic stirrer with stirring bar for mixing.
- Fine mist sprayer, tissues or paper towels for application.
- Dark bottles for storage.

3 Materials and Chemicals

- Leucocrystal violet (dye content $\geq$ 90%)
- 5-Sulfosalicylic acid (purity $\geq$ 99%)
- Hydrogen peroxide 3% solution
- Sodium acetate

4 Mixing Procedure

.01 Combine ingredients in the order listed and place on a stirring device for approximately 30 minutes.

- Hydrogen peroxide 3%…….. 500 mL
- 5-Sulfosalicylic acid…….. 10 g
- Sodium acetate…….. 3.7 g
- LCV……. 1 g

5 Control Procedures

A positive control will be performed on the reagent before every application to ensure its reliability. The reagent will be tested by successfully developing a known blood standard. Successful development will be indicated by a purple reaction. This control procedure must be documented in the appropriate case notes.

6 Processing Procedure

- Spraying is the most effective method of application.
- When spraying, use the finest mist possible because excess application may cause over development or running of the bloody print.
- Spray the specimen(s)--the development will occur within 30 seconds---then blot the area with a tissue or paper towel.
- When the area is dry, the preceding steps can be repeated to possibly improve contrast.

7 Technical Notes

- When using LCV process in direct sunlight, any developed print should be photographed as soon as possible because ionization may occur, resulting in unwanted background development.
- LCV process may be used before Amido Black.
- On non-porous vertical surfaces, running of the blood print is more likely to occur.
- CA fuming may inhibit the LCV process.

8 Preservation

- LCV developed blood prints can only be preserved by photography.

9 Storage

- LCV reagent must be stored in a dark brown bottle.
- LCV is mildly acidic and should be stored in the lab refrigerator to extend the shelf life.

10 Shelf Life

- LCV dye in powder form---Indefinite.
- LCV mixed reagent---Up to 30 days.

11 Disposal

- Small amounts of powder LCV may be wrapped in paper and discarded in waste receptacle.
- Excess LCV mixed reagent in properly marked waste container.

12 Clean-Up

- Soap and water for LCV stained areas.
- Use acid kit to clean up accidental spills.

References

- FBI Latent Processing Guide (2000)

NINHYDRIN - ACETONE BASE

1 Scope

Ninhydrin is used to develop latent prints on porous surfaces. Ninhydrin reacts with the amino acids present in perspiration. The reaction will range from a light violet to a dark purple and is called Ruhemann's Purple.

2 Equipment

- Mixing--Scales, beakers, graduated cylinders, and magnetic stirrer with stirring bar.
- Application--Glass trays, squirt bottle, and humidity chamber (or steam iron).
- Storage--Dark bottle.

3 Materials and Chemicals

- Ninhydrin
- Acetone

4 Mixing Procedure

.01 The Ninhydrin crystals will readily dissolve in acetone. Minimal stirring is required.

- Ninhydrin…….. 5.0 g
- Acetone……. 500 mL

5 Control Procedures

A positive control will be performed on the reagent before every application to ensure its reliability. The reagent will be tested by successfully developing a known fingerprint standard. Successful development will be indicated by a purple reaction. This control procedure must be documented in the appropriate case notes.

6 Processing Procedure

- The ninhydrin solution can be applied to a specimen by spraying, dipping, or painting.
- Once the solution has been applied, it must be dried before any attempt is made to accelerate the development process using a humidified environment (e.g. a humidity chamber or a steam iron).
- If a humidity chamber is available, set humidity at 65% for best results.

7 Technical Notes

- Ninhydrin Acetone base has the strongest tendency to run inks.
- Ninhydrin works better in an environment of 65% humidity.
- Ninhydrin must be used after Iodine and DFO.
- Ninhydrin must be used before Physical Developer or Silver Nitrate.
- Ninhydrin does not fluoresce under normal use.

8 Preservation

- Ninhydrin developed latent prints can only be preserved by photography.

9 Storage

- Ninhydrin reagent must be stored in a clean dark glass bottle.
- Ninhydrin reagent is flammable and must be stored in a flammable cabinet.

10 Shelf Life

- Ninhydrin crystals……..indefinite.
- Ninhydrin reagent……..up to 1 year.

11 Disposal

- Ninhydrin reagent must be discarded in a flammable waste container.
- Ninhydrin crystals may be wrapped in paper and placed in waste receptacle.

12 Clean-Up

- Ninhydrin stain may be removed by using a 50-50 solution of sodium hypochlorite (bleach) and then rinsing the items in clean water.
- Use flammable spill kit on accidental spills of ninhydrin reagent.

References

- FBI Latent Processing Guide (2000)

NINHYDRIN - PETROLEUM ETHER BASE

1 Scope

Ninhydrin is used to develop latent prints on porous surfaces. Ninhydrin reacts with the amino acids present in perspiration. The reaction will range from a light violet to a dark purple and is called Ruhemann's Purple.

2 Equipment

- Mixing--Scales, beakers, graduated cylinders, and magnetic stirrer with stirring bar.
- Application--Glass trays, squirt bottle, and humidity chamber (steam iron).
- Storage--Dark bottle.

3 Materials and Chemicals

- Ninhydrin
- Methanol
- Isopropanol
- Petroleum Ether

4 Mixing Procedure

.01 The Ninhydrin crystals are first dissolved in methanol on a stirring device.

.02 Then the isopropanol is added, followed by the petroleum ether.

- Ninhydrin……. 5.0 g
- Methanol…….. 15 mL
- Isopropanol…….. 20 mL
- Petroleum Ether……465 mL

5 Control Procedures

A positive control will be performed on the reagent before every application to ensure its reliability. The reagent will be tested by successfully developing a known fingerprint standard. Successful development will be indicated by a purple reaction. This control procedure must be documented in the appropriate case notes.

6 Processing Procedure

- The Ninhydrin solution should be applied to a specimen by dipping or painting.
- Once the solution has been applied, it must be dried before any attempt is made to accelerate the development process using a humidified environment (e.g. a humidity chamber or a steam iron).
- If a humidity chamber is available, set humidity at 65% for best results.

7 Technical Notes

- Ninhydrin PE base has the least tendency to run inks.
- Use magnetic stirrer at slower speed. High speed may cause separation.
- Ninhydrin works better in an environment of 65% humidity.
- Ninhydrin must be used after Iodine and DFO.

- Ninhydrin must be used before Physical Developer or Silver Nitrate.
- Ninhydrin does not fluoresce under normal use.

8 Preservation

- Ninhydrin developed latent prints can only be preserved by photography.

9 Storage

- Ninhydrin reagent must be stored in a clean dark glass bottle.
- Ninhydrin reagent is flammable and must be stored in a flammable cabinet.

10 Shelf Life

- Ninhydrin crystals------indefinite.
- Ninhydrin reagent------up to 1 year.

11 Disposal

- Ninhydrin reagent must be discarded in a flammable waste container.
- Ninhydrin crystals may be wrapped in paper and placed in waste receptacle.

12 Clean-Up

- Ninhydrin stain may be removed by using a 50-50 solution of sodium hypochlorite and then rinsing the items in clean water.
- Use flammable spill kit on accidental spills of ninhydrin reagent.

References

- FBI Latent Processing Guide (2000)

NINHYDRIN - DRY

1 Scope

Ninhydrin is used to develop latent prints on porous surfaces. Ninhydrin reacts with the amino acids present in perspiration. The reaction will range from a light violet to a dark purple and is called Ruhemann's Purple. Certain substrates can be damaged or destroyed if saturated with a liquid. The Dry Ninhydrin technique offers a non-destructive method by allowing porous items to be processed with ninhydrin without having to be saturated with a conventional solution.

2 Materials and Chemicals

- Ninhydrin – Acetone or Petroleum Ether based
- Blotter paper
- Plastic bag (Ziploc type)

3 Control Procedures

A positive control will be performed on the reagent before every application to ensure its reliability. The reagent will be tested by successfully developing a known fingerprint standard. Successful development will be indicated by a purple reaction. This control procedure must be documented in the appropriate case notes.

4 Processing Procedure

- A blotter paper sheet is folded in half, saturated with ninhydrin solution and allowed to dry <u>completely</u>.
- The evidence is placed in between the dried, folded blotter paper ensuring that the evidence is completely covered on both sides. Ridge detail will not be developed unless it is covered by the blotter paper.
- The blotter paper containing evidence is placed within a Ziploc type baggie, with as much air forced out of the bag as possible before sealing.
- The baggie is then secured in a dark area for a minimum of 48 hours before examining for developed ridge detail.
- If developed ridge detail is satisfactory, it will be documented using digital images.

5 Technical Notes

- If the ridge detail is faint or unsatisfactory, the evidence can be placed back into the blotter paper, the baggie resealed and placed into a dark area again.
- The evidence can be re-examined every 24 hours until satisfactory results are reached.
- A heavy solid object (like a heavy book) can be placed on top to ensure that both sides of the blotter paper are in direct contact with the evidence.
- The blotter paper can be re-used. However, a thick paper towel can be used also.
- Ninhydrin works better in an environment of 65% humidity.
- Ninhydrin must be used after Iodine and DFO.
- Ninhydrin must be used before Physical Developer or Silver Nitrate.
- Ninhydrin does not fluoresce under normal use.

6 Preservation

- Ninhydrin developed latent prints can only be preserved by photography.

7 Storage

- Ninhydrin reagent must be stored in a clean dark glass bottle.
- Ninhydrin reagent is flammable and must be stored in a flammable cabinet.

8 Shelf Life

- Ninhydrin crystals------indefinite.
- Ninhydrin reagent------up to 1 year.

9 Disposal

- Ninhydrin reagent must be discarded in a flammable waste container.
- Ninhydrin crystals may be wrapped in paper and placed in waste receptacle.

10 Clean-Up

- Ninhydrin stain may be removed by using a 50-50 solution of sodium hypochlorite and then rinsing the items in clean water.
- Use flammable spill kit on accidental spills of ninhydrin reagent.

References

- Stimac, Jon T. 2005. Dry Ninhydrin. Gizmos and Gadgets
- Olsen, Robert D. Sr. 1978. Scott's Fingerprint Mechanics

PHYSICAL DEVELOPER

1 Scope

Physical developer (PD) is used to develop latent prints on porous surfaces and on certain nonporous surfaces. Physical developer has also been found to be highly effective in developing latent prints on paper currency. Sodium hypochlorite can also be used in conjunction with physical developer. The sodium hypochlorite solution darkens the latent prints(s) developed with physical developer, lightens the background, and removes any ninhydrin stains that may still be present on the specimen(s). This process is especially effective on paper bags and paper currency. Mixing and processing procedures for sodium hypochlorite follow those listed for physical developer. Stains on blueprints, photographs, or photostats caused by physical developer treatment cannot be removed without defacing the specimens.

2 Equipment

- Mixing--scales, beakers, graduated cylinder, and magnetic stirrer with stirring bar.
- Application--glass trays, orbital shaker, iron.
- Storage--clear and dark glass bottles.

3 Materials and Chemicals

- Ferric nitrate (purity 100%)
- Ferrous ammonium sulfate (reagent grade)
- Citric acid (reagent grade)
- n-Dodecylamine acetate
- Synperonic-N
- Silver nitrate (reagent grade purity $\geq$ 99%)
- Maleic acid
- De-ionized Water

4 Mixing Procedures

.01 Physical developer is mixed in four solutions. Each must be placed on a stirring device until all the chemicals are thoroughly dissolved.

.02 Solution 1 (Maleic acid)

- Maleic acid……. 25 g
- De-ionized water……1000 mL

.03 Solution 2 (Redox)

- Ferric nitrate…….. 30 g
- Ferrous ammonium sulfate… 80 g
- Citric acid…….. 20 g
- De-ionized water……. 1000 mL

.04 Solution 3 (Detergent)

- N-Dodecylamine acetate……. 3 g

- Synperonic-N…….. 4 mL
- De-ionized water……. 1000 mL
- Place on magnetic stirrer for 30 min.

.05 Solution 4 (Silver nitrate)
- Silver nitrate……. 20 g
- De-ionized water…….. 100 mL

5 Control Procedures

A positive control will be performed on the reagent before every application to ensure its reliability. The reagent will be tested by successfully developing a known fingerprint standard. This control procedure must be documented on the appropriate note worksheet. There is no reliable control for Physical Developer. Control prints that are older have a better chance of developing.

6 Processing Procedure

.01 Tray 1---Solution 1 (Maleic Acid)
- Place the specimen(s) in Solution 1 and submerge.
- All specimens must be left in this solution for 5 minutes.
- If a specimen begins to emit bubbles, it must be submerged in the solution until the bubbling action ceases.

.02 Tray 2---Solution 2 (Redox Working Solution)
- The Redox working solution must be combined in the order listed.
- Solution 2 is placed in a beaker on a stirring device.
- Solutions 3 and 4 are then added and mixed for 3 to 5 minutes.
- Once mixed, it is then placed in Tray 2, which is in turn placed on an orbital shaker.
- The orbital shaker is set for a gentle rocking motion of the Redox working solution to assist the development process.
- If an orbital shaker is not available, rocking Tray 2 back and forth manually can also be effective.
- Submerge the specimen(s) for 5 to 15 minutes.
- The amount of time will depend on the number of specimens in the tray.
- Generally, the more specimens in the tray, the longer the reaction time will be.
- Approximately 15 check-sized specimens can normally be processed with 1 L of Redox working solution.
  - Solution 2……1000 mL
  - Solution 3…… 40 mL
  - Solution 4…… 50 mL

.03 Tray 3---De-ionized Water Rinse
- The specimen(s) removed from the Redox working solution, Tray 2, must be rinsed with water to remove the excess solution. If this is not done, when the

specimen is dried, it will become brittle and may be easily damaged or destroyed. Use multiple trays of clean wash water if necessary until specimen rinses clean.

.04 Drying Specimen(s)

- The specimens removed from the water rinse, must be dried. This can be done by air drying or applying heat (e.g., a dry iron).

7 Technical Notes

- Rinse all trays with de-ionized water prior to use.
- PD can be used on porous items that have been wet.
- Maleic acid must be used to normalize the pH before using PD.
- Sodium hypochlorite can be used as a brightening reagent.

8 Preservation

- PD developed latent prints must be photographed.

9 Storage

- Solution 1…….clear or dark bottles.
- Solution 2…….clear or dark bottles.
- Solution 3…….clear or dark bottles.
- Solution 4…….dark bottles.

10 Shelf Life

- Solution 1……..indefinite
- Solution 2……..indefinite
- Solution 3……..up to 1 year
- Solution 4……..up to 1 year

11 Disposal

- Discard waste in properly marked receptacle.

References

- FBI Latent Processing Guide (2000)
- Lightning Powder Co., Inc. "Chemical Processing for Latent Prints" (2001)

SILVER NITRATE - WATER AND ALCOHOL BASE

1 Scope

Silver nitrate is used to develop latent prints on porous specimens. It reacts with the sodium chloride (salt) content in perspiration. Silver nitrate can be prepared with two different carriers---water or alcohol. An alcohol-based solution can be prepared for processing specimens (e.g., waxed papers, cardboard with a wax finish, or Styrofoam ™) that may repel a water-based mixture. Stains or blueprints, photographs, or photostats caused by silver nitrate treatment cannot be removed without defacing the specimen's. Latent prints developed by the silver nitrate method on certain types of glossy paper will often disappear within hours. These latent prints should be photographed as soon as possible.

2 Equipment

- Mixing---scales, beaker, magnetic stirrer with stirring bar.
- Application---glass tray, brush, and high-intensity light (or sunlight).
- Storage---dark glass bottles.

3 Materials and Chemicals

- Silver nitrate (reagent grade purity $\geq$ 99%).
- De-ionized water
- Ethanol

4 Mixing Procedure

.01 Water Base

- Silver nitrate……. 15 g
- De-ionized water…… 500 mL

Combine the silver nitrate and de-ionized water and place on a stirring device for approximately 10 minutes or until all the crystals are dissolved.

.02 Alcohol Base

- Silver nitrate……. 15 g
- De-ionized water…….. 50 mL
- Ethanol……. 500 mL

Combine the silver nitrate and de-ionized water and place on a stirring device until all the crystals are dissolved. Add this solution to the ethanol.

5 Control Procedures

A positive control will be performed on the reagent before every application to ensure its reliability. The reagent will be tested by successfully developing a known fingerprint standard. Successful development will be indicated by a grey to dark reaction. This control procedure must be documented in the appropriate case notes.

6 Processing Procedure

When applying the silver nitrate solution to a specimen, it can be dipped or painted. The specimen must be dried and then subjected to high-intensity light or sunlight to develop prints.

7 Technical Notes

- Silver nitrate developed latents will continue to develop if exposed to any light.
- Silver nitrate process is the last process to be considered.

8 Preservation

- Silver nitrate developed latent prints must be photographed.

9 Storage

- Dark glass bottles

10 Shelf Life

- Up to 1 year.

11 Disposal

- Water base solution must be discarded in properly marked waste receptacle.
- Alcohol base solution must be discarded in a flammable waste receptacle.

12 Clean-Up

- The stain is permanent and generally cannot be cleaned up.

References

- FBI Latent Processing Guide (2000)
- Texas DPS Student Handout "Silver Nitrate Processing", T-350 (1988)

SODIUM HYPOCHLORITE (BLEACH)

1 Scope

Sodium hypochlorite is not a latent processing reagent, but is used as clearing reagent for ninhydrin or DFO developed latent prints. It is also used as a brightening reagent for latent prints developed with physical developer.

2 Equipment

- Mixing---beaker
- Application---glass trays
- Storage---dark glass bottles

3 Materials and Chemicals

- Sodium hypochlorite (bleach)
- De-ionized water

4 Mixing Procedure

.01 Sodium hypochlorite is mixed with de-ionized water in a 1:1 dilution ratio to form a 50% working solution.

.02 Working Solution

- Sodium hypochlorite……250 mL
- De-ionized water……250 mL

5 Control Procedures

There is no control for this chemical.

6 Application

- For ninhydrin developed latent prints it is used to clear the ninhydrin stain.
- For PD developed latent print it is used to brighten dark stains.
- After a specimen has been processed with physical developer or ninhydrin, it is then dipped in the sodium hypochlorite solution for approximately 15 seconds. The specimen is then placed in a water rinse. If the specimen is not thoroughly rinsed, deterioration of the specimen may occur.

7 Storage

- Clear or dark colored bottles.

8 Shelf Life

- Sodium hypochlorite working solution…….indefinite

9 Disposal

- Excess may be disposed of down a lavatory drain.

10 Clean-Up

- Not Applicable

References

- FBI Latent Processing Guide (2000)

SMALL PARTICLE REAGENT - SPR

1 Scope

Small particle reagent (SPR) is another name for Molybdenum Disulfide and is well known for its ability to develop latent prints on wet surfaces. It can also be used successfully on paper, cardboard, new metal, rusted metal, galvanized metal, bricks, rocks, concrete, plastic, vinyl, wood, and glass. It can even be used under water as long as the spray bottle has sufficient force to propel it through the water. However, as with all processes, the results depend upon the amount of residue deposited by the friction ridge skin.

2 Equipment

- Mixing—4 liter amber bottle, two spray bottles, transfer pipette.
- Application---glass tray, sprayer or squirt bottle.
- Storage---dark bottle.

3 Materials and Chemicals

Photoflo 200……. ……. 2-3 drops
De-ionized Water……..one liter
Molybdenum Disulfide…….30 grams

4 Mixing Procedure

Pour the liter of deionized water into the 4 liter bottle. Add 30 grams of Molybdenum Disulfide and two or three drops of Photoflo 200. Put the lid on the bottle and continuously agitate the bottle until powder is dissolved (3-5 minutes). No powder should remain floating on the surface. If foam is observed floating on the surface of the agitated liquid, too much Photoflo 200 was added and it may be necessary to discard the solution and start over.

5 Control Procedures

A positive control will be performed on the reagent before every application to ensure its reliability. The reagent will be tested by successfully developing a known fingerprint standard. Successful development will be indicated by a dark grey to black reaction. This control procedure must be documented in the appropriate case notes.

6 Processing Procedure

.01 Immersion Technique:

- Shake the solution and pour into a tray or dish.
- Immediately place the evidence in the solution so that the solution will cover the surface where latents are suspected.
- Do not agitate the solution while evidence is immersed.
- Immerse for 2 – 3 minutes, then carefully remove the evidence and either rinse gently or float the evidence face down in a tray of clear water.
- Latents can be photographed and/or lifted once the item is dry.

.02 Spray Bottle Application:

- Shake the solution and pour into a spray bottle.
- Pour clean water into the other spray bottle.
- Spray solution onto area to be searched for latent prints (wet or dry surface).
- Shake the solution bottle between sprays.
- Using the clean water spray bottle, rinse the area where the solution has been applied and watch for the 'separation' of the water from the area with latent prints.
- Latents can be photographed and/or lifted once the item is dry.

7 Technical Notes

Ridge detail will appear as dark gray on light colored surfaces and light gray on dark surfaces. Do not accelerate the drying process with a hair dryer. It is possible to lift latent prints while item surface is still wet, however, care must be taken not to get water under the tape as this may destroy the latent.

8 Storage

- Dark amber bottles or clear stoppered plastic bottles

9 Shelf Life

- Molybdenum Disulfide powder: indefinite
- Mixed solution: four weeks

10 Disposal

- Place in marked chemical waste bin for proper disposal.

11 Clean-Up

- Soap and Water

References

- Lightning powder company technical notes "small particle reagent" 2005

STICKY-SIDE POWDER

1 Scope

Sticky-side powder is used to process the sticky side of adhesive tapes and labels for latent prints.

2 Equipment

- Mixing---shallow dish, mixing spoon.
- Application---camel or small hair brush, and tap water.
- Storage---brown bottle for photo-flo working solution.

3 Materials and Chemicals

- Sticky-side powder…1 tsp (amount can vary according to items processed)
- Photo-Flo™ 200 solution
- De-ionized water

4 Mixing Procedure

- Follow manufacturer's instructions.

5 Control Procedures

A positive control will be performed on the reagent before every application to ensure its reliability. The reagent will be tested by successfully developing a known fingerprint standard. Successful development will be indicated by a grey to black reaction. This control procedure must be documented in the appropriate case notes.

6 Processing Procedure

- Powder is mixed with a liquid. This mixture is applied to the adhesive side of the item using a small brush. Mixture will remain on item for 10-30 sec. Item is rinsed using a slow stream of tap water. Allow to dry. -See manufacturer's instructions-

7 Technical Notes

- Any latent prints will be light gray to black in color.
- Preserve by photography with scale.
- Photograph with adhesive side of tape facing up.
- Additional process is acceptable for light latent prints.
- Dried tape items can be secured on clear plastic sheets.
- This technique may interfere with other processing techniques
- This technique is not suitable for dark items
- Instead of cold tap water the excess may be washed off in a tray with clean water.
- Instead of cold tap water a lab wash bottle may wash off the excess.

8 Storage

- Not applicable

9 Shelf Life

- Prepare as needed

10 Disposal

- Small amounts of powder may be wrapped in paper and discarded.
- Excess mixed solution placed on paper, folded and discarded.

11 Clean-Up

- Clean dish and brush in soap and water.
- Use soap and water for surfaces.

References

- FBI Latent Processing Guide (2000)
- Lightning Powder Co., Inc. "Chemical Processing for Latent Prints" (2001)

SUDAN BLACK

1 Scope

Sudan black is a dye that stains sebaceous perspiration to produce a blue-black image. This method is used on surfaces contaminated with foodstuff, oils, and other greasy substances.

2 Equipment

- Mixing---beakers, magnetic stirring device with stirrers.
- Application---glass tray
- Storage---clear or dark glass bottles.

3 Materials and Chemicals

- Sudan black
- Ethanol
- De-ionized water

4 Mixing Procedure

- Sudan black……. 7.5 g
- Ethanol……. 500 mL
- De-ionized water…… 250 mL

Combine the Sudan black and the ethanol and place on a magnetic stirrer for 15 minutes. Then add the de-ionized water and stir to obtain the working solution. Some of the Sudan black will not be dissolved.

5 Control Procedures

A positive control will be performed on the reagent before every application to ensure its reliability. The reagent will be tested by successfully developing a known fingerprint standard. Successful development will be indicated by a black reaction. This control procedure must be documented in the appropriate case notes.

6 Processing Procedure

- Shake working solution and pour a sufficient amount into a glass tray.
- Immerse the specimen(s) in the Sudan black working solution for approximately 2 minutes.
- Remove the specimen(s), rinse with tap water, and let dry.

7 Technical Notes

- Works on smooth or rough, nonporous surfaces contaminated with grease.
- Can be used on waxy surfaces such as candles or wax-paper cartons.
- Will also enhance CA fumed latent prints.
- Better contrast observed when the latent print has dried.

8 Preservation

- Latent image must be photographed.

9 Storage

- Clear or dark bottles

10 Shelf Life

- Sudan black powder---Indefinite
- Sudan black working solution---Indefinite

11 Disposal

- Excess Sudan black powder wrapped in paper and placed in trash receptacle.
- Sudan working solution---use a flammable spill kit.

12 Clean-Up

- Soap and water to clean up fresh stains. Bleach or acetone for tough stains.

References

- FBI Latent Processing Guide (2000)
- Lightning Powder Co., Inc. "Chemical Processing for Latent Prints", (2001).

TITANIUM DIOXIDE (TD) – METHANOL BASE

1 Scope

Titanium Dioxide is used to develop latent prints and enhance visible prints that have been deposited in blood on dark colored surfaces.

2 Equipment

- Mixing---------scales, beakers, graduated cylinder.
- Application---laboratory squirt bottle or camel hair brush.
- Storage--------dark glass bottle for dry powder.

3 Materials and Chemicals

- Titanium Dioxide powder
- Methanol
- De-ionized water

4 Mixing Procedure

.01 The Titanium Dioxide process consists of two solutions—a developer and a methanol rinse.

.02 **DEVELOPER SOLUTION**

- Titanium Dioxide……..1 g
- Methanol……...10 mL

.03 **<u>RINSE SOLUTION</u>**

- Methanol……enough to rinse item.

5 Control Procedures

A positive control will be performed on the reagent before every application to ensure its reliability. The reagent will be tested by successfully developing a known blood standard. Successful development will be indicated by a white reaction. This control procedure must be documented in the appropriate case notes.

6 Processing Procedure

- Apply the developer to the specimen by dipping or using a squirt bottle. Continue to agitate working solution during process, powder will separate.
- Leave the developer on the specimen for approximately 10 seconds to 1 minute (time will vary with the type of surface, porous or non-porous).
- Apply the methanol rinse.
- Allow the specimen to dry.
- Contrast can be improved by cleaning of the excess with camel hair brush

7 Technical Notes

- The color will be from white to light gray.
- Additional processing is acceptable for light colored prints.
- CAE fuming may interfere with this process.
- A physical technique, the powder is adhering to the blood print. When using squirt bottle, a bottle should be dedicated.
- May be used on semi-porous as well as non-porous surfaces.
- Once dried a shell is created inhibiting other processes.
- If surface is not compatible with methanol use the formula for tapes. Be sure the print has been fixed with heat first.

8 Preservation

- The preferred method of preservation is photography.

9 Storage

- Not applicable.

10 Shelf Life

- References indicate an indefinite shelf life, whereby the working solution is prepared as needed.

11 Disposal

- Pick up large spill with a solvent package and dispose in airtight container.
- Pick up small spill with absorbent paper. Wrap in several layers of paper and discard.

12 Clean-Up

- Clean mixing material in soap and warm water and then place in dishwasher.
- Surfaces can be cleaned with soap and warm water.

References

- Development of Bloody Prints on Dark Surfaces with Titanium Dioxide and Methanol, Journal of Forensic Identification, 53:2 (2003).

TITANIUM DIOXIDE (TD) – PHOTO-FLO BASE

1 Scope

Titanium Dioxide is used to process both sides of dark colored adhesive tapes, however it has been found to be much more effective being utilized on the adhesive side.

2 Equipment

- Mixing---------shallow dish, mixing spoon.
- Application---camel or small hair brush, and tap water.
- Storage--------brown bottle for photo-flo working solution.

3 Materials and Chemicals

- Titanium Dioxide powder…1 g. (amount can vary according to items processed)
- Photo-Flo™ 200 solution
- De-ionized water

4 Mixing Procedure

- Prepare mixing solution by diluting Photo-Flo™ 200 solution in de-ionized water by 50% to make Photo-Flo™ 100 solution.
- Place Titanium Dioxide powder in small dish
- Add Photo-Flo™ 100 solution to powder and stir until mixture is the consistency of thin paint.

5 Control Procedures

A positive control will be performed on the reagent before every application to ensure its reliability. The reagent will be tested by successfully developing a known fingerprint standard. Successful development will be indicated by a whitereaction. This control procedure must be documented in the appropriate case notes.

6 Processing Procedure

- Mixed solution is painted on both sides of the tape with a small brush.
- Allow to set for 1 to 2 minutes.
- Rinse off the solution with a slow stream of cold tap water or rinse in a tray of water. Allow to dry.

7 Technical Notes

- Any latent prints will be white to light gray in color.
- Preserve by photography with scale.
- Additional processing is acceptable for light colored prints.
- Dried tape items can be secured on clear plastic sheets for preservation.
- This technique may interfere with other processing techniques.
- This technique is not suitable for light colored tapes.
- The prints on the adhesive side are likely going to be of better quality than the non-adhesive side.
- If not working on smooth side of tape allow to dry, and then gently wipe over the top with damp paper towel removing the excess.

- This is a physical technique, whereby the powder is adhering to the latent print residue.

8 Storage

- Not applicable.

9 Shelf Life

- References indicate an indefinite shelf life, whereby the working solution is prepared as needed.

10 Disposal

- Small amounts of powder may be wrapped in paper and discarded.
- Excess mixed solution placed on paper, folded and discarded.

11 Clean-Up

- Clean dish and brush in soap and water.
- Use soap and water for surfaces.

References

- Development of Latent Prints Using Titanium Dioxide (TiO2) in Small Particle Reagent, White (SPR-W) on Adhesives, Journal of Forensic Identification, 55:3 (2005).
- Development of Latent Prints with Titanium Dioxide (TiO2), Journal of Forensic Identification, 52:5 (2002).

APPENDIX C LATENT PRINT DEVELOPMENT TERMS

AFIS

Automated Fingerprint Identification System. Computerized system for storage, searching and retrieval of ten print and latent print records based on friction ridge detail. (SWGFAST)

ALS

Alternate Light Source. Any light source, other than a laser, used to excite luminescence of latent prints, body fluids, etc., at crime scenes or on items of evidence. Now commonly referred to as a forensic light source (FLS). (SWGFAST)

APFIS

Automated Palm Fingerprint Identification System. Computerized system for storage, searching and retrieval of known and latent palm print records based on friction ridge detail. (SWGFAST)

ARTIFACT

1. Any distortion or alteration not in the original friction ridge impression.
2. Any information not present in the original object/image, inadvertently introduced by image capture, processing, compression, transmission, display or printing. (SWGFAST)

CHARACTERISTIC(S) – CLASS

General characteristics used to put things into groups or classes, e.g. arches, loops and whorls. (SWGFAST)

CHARACTERISTICS(S) – INDIVIDUAL

Features of the friction ridges. Synonyms are minutia(e), Galton Details, point, feature, ridge formation, ridge morphology. (SWGFAST)

CLARITY

Visual quality of a friction ridge impression. (SWGFAST) Most important aspect of a print. The more clear the print, the more information derived.

CREASE

A line or linear depression; grooves at the joints of the phalanges, at the junction of the digits and across the palmar and plantar surfaces that accommodates flexion. (SWGFAST)

DERMIS

The inner layer of skin beneath the epidermis. (SWGFAST)

DISTORTION

Variances in the reproduction of friction skin caused by pressure, movement, force, contact surface, or processing medium. (SWGFAST)

ECCRINE GLANDS

Sweat glands that open on all surfaces of the skin. (SWGFAST)

ELIMINATION PRINTS
Exemplars of friction ridge skin detail of persons known to have had access to the item examined for latent prints.(SWGFAST)

EPIDERMIS
The outer layer of the skin. (SWGFAST)

EXEMPLAR
Friction ridge record of an individual, recorded electronically, photographically, by ink or some other medium. (SWGFAST)

FINGERPRINT
An impression of the friction ridges on all or any part of the finger. (SWGFAST)

FLS
Forensic Light Source. See ALS. (SWGFAST)

FRICTION RIDGE
A raised portion of the epidermis on the palmar or plantar skin. (SWGFAST)

FRICTION RIDGE DETAIL (MORPHOLOGY)
An area comprised of the combination of ridge flow, ridge characteristics, and ridge structure. (SWGFAST)

FURROWS
Valleys or depressions between the friction ridges. (SWGFAST)

IAFIS
Integrated Automated Fingerprint Identification System. The FBI's national AFIS. (SWGFAST)

INKED PRINT (FINGER, PALM, FOOT)
A recording of the friction ridges with black ink on a suitable contrasting background. See Exemplar (SWGFAST)

LATENT LIFT
An adhesive or other medium on which recovered friction ridge detail is preserved. (SWGFAST)

LATENT PRINT
Transferred impression of friction ridge detail not readily visible, generic term used for questioned friction ridge detail. (SWGFAST)

LIVE SCAN
Electronic recording of friction ridges (fingers and/or palms).

MAJOR CASE PRINTS

A systematic recording of all of the friction ridge detail appearing on the palmar sides of hands. This includes the extreme sides of the palms, joints, tips, and sides of the fingers. (SWGFAST)

MINUTIAE

See Characteristics.

PALM (PALMAR AREA)

The friction ridge skin area on the side and underside of the hand.(SWGFAST)

PATENT PRINT

Friction ridge impression of unknown origin, visible without development. (SWGFAST)

PLANTAR AREA

The friction ridge skin area on the side and underside of the foot.

POINTS / POINTS OF IDENTIFICATION

See Characteristics.

PORES

Small openings on friction ridges through which body fluids are released.(SWGFAST)

RIDGE FLOW

The direction of a series of adjacent friction ridges. (SWGFAST)

RUVIS

Reflected Ultra-Violet Imaging System. A system based on the detection and amplification of short-wave UV light (not luminescence) from latent prints. (SWGFAST)

SEBACEOUS GLAND

An oil-secreting gland generally associated with a hair follicle. (SWGFAST)