City of BUENA PARK

Police Department

FORENSIC SERVICES UNIT MANUAL

Revised: February 2024

Accredited through the Commission on Accreditation for Law Enforcement Agencies

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I. INTRODUCTION

This manual is meant to provide guidance and direction for the Forensic Services Unit (FSU) and for crime scene investigations within the City of Buena Park.

This manual should help you, as a Forensic Specialist, to develop and maintain consistency in your processing and handling of evidence. It's also a reference for all police personnel to increase their awareness of acceptable techniques and standards used in the field of forensic identification. This should be a resource for training new crime scene investigators, but even experienced forensic specialists are required to be familiar with the subject matter and the procedures discussed here.

Understandably, you will be equally responsible for adhering to the other existing Buena Park Police Department Operational Policies and Procedures that apply to all active employees; specifically, to the professional conduct sections and the overall workings of the police agency that employs you.

Besides demonstrating positive communication and representation to our community and fellow workers, we must share our priorities and values, such as honesty, integrity, and professionalism. This demonstrates our respect for the legal system that we took a civil oath to uphold, and which we should never compromise.

No author, instructor, or authority in the field of forensic crime scene investigation can or will set down a series of rules governing the *exact* procedure for processing a crime scene. If all crimes were committed under the same conditions and the same circumstances, then we could establish specific criteria. The victims, law enforcement, and the suspects involved have no control over those factors. Therefore, only guidelines, suggestions, and personal experiences can be offered to handle each crime scene on an individual basis.

This manual has been developed through the efforts of the Buena Park Police Department (BPPD) forensic specialists and supervisors (both past and present), and in cooperation with the Orange County Crime Lab, the National Institute of Justice, and the California Department of Justice Bureau of Forensic Services. This manual is subject to future alteration and revision as practices, technology, and equipment continue to advance.

II. HOURS AND CALL-INS

Currently, the BPPD employs three full-time forensic specialists in the FSU. The FSU Supervising Sergeant directs and approves this coverage based on the needs of the Department. You're aware that you're liable to being called in during non-working hours if a field sergeant or the Watch Commander deems it necessary and the Forensic Supervisor approves. The FSU Supervising Sergeant or his/her designee maintains a fair rotational call-in calendar. The call-in calendar is accessible for everyone who needs to reference it (i.e., Dispatch) through the common Outlook calendar. (See Appendix A for additional information on call-ins).

If a routine call comes in during the hours no forensic specialist is available, the requesting officer should make a written request to have the next available forensic specialist on duty respond to the crime scene.

The on-scene officer and his/her supervisor are responsible for requesting a forensic specialist to respond on a call-in to other types of crimes. As a general rule, you should be called in only for serious felony crimes (such as robbery, murder, rape, burglary with extensive loss, and major assaults). An officer may choose not to request a forensic specialist if it's obvious that a forensic call-in won't lead to anything of evidentiary value.

An officer may collect evidence at the scene for later processing by a forensic specialist. The officer shall package and book the evidence according to BPPD procedure and fill out a FSU request form for processing.

The investigating officer and his/her supervisors will use their best judgement in determining the level of response to low felonies and high misdemeanors. Auto burglaries and auto thefts most often fall into these categories.

As a general rule, you won't routinely respond to cases involving low misdemeanors, such as garage burglaries, attempted crimes, or crimes with out-of-state victims who won't return for prosecution. The field officer will determine the need for exceptions for these types of crimes and, if necessary, seek his/her supervisor's approval.

The investigating officer will request a forensic specialist in all cases involving a suspected homicide. If necessary, the Watch Commander may call the Orange County Crime Lab (OCCL) to assist at the crime scene if asked for by the forensic specialist(s), detectives, or supervising sergeants.

The investigating officer will call for the OCCL instead of Buena Park FSU forensic specialists in all cases of officer-involved shootings (OIS) resulting in injury to officers, suspects, or civilians, or in any homicide case involving employees or officers of the City.

When OCCL is called, a BPPD FSU forensic specialist should respond to document the scene "as is," using photographs and sometimes video. BPPD personnel shouldn't take further forensic action until OCCL arrives. Once OCCL arrives, BPPD will turn over the scene to them for handling according to Sheriff's Department policies and procedures.

Forensic specialists are a resource provided to assist with criminal investigations only. You won't be used for any private (civil) or political purposes.

III. LAB EFFICIENCY / OVERSIGHT

You're responsible for a number of areas within the confines of our lab, along with an enormous amount of equipment and tools that need proper handling, replenishment, and maintenance. Notably, the following main areas are under the daily direction of forensic specialists.

1. Biohazard Evidence Drying Room (See Appendix A)
2. Evidence Processing Room (main lab)
3. Employee Workstation Area (front office)
4. Latent Processing Room
5. Forensic Supply Room
6. CAL-ID (AFIS) System
7. Forensic Services Vehicle (See BPPD Policy 704, Special Use Vehicles)

Forensic specialists currently report to the Crimes Property Detective Sergeant as their FSU Supervisor. That FSU Supervisor also oversees an entire section of other investigative personnel and isn't physically located within the lab. Hence, the day-to-day operation and oversight of lab efficiency ultimately resides in the work ethic of the trusted employees of this area.

Historically, lab efficiency and oversight has been practiced by the FSU Supervisor by relying on spot checks, routine meetings, open-door communication, approving forensic reports, reviewing statistics, and input from the forensic specialists.

IV. CRIME SCENE INVESTIGATION

A. Notes

The forensic specialist has numerous responsibilities while conducting a crime scene investigation. Perhaps the most important responsibility is thorough note-taking. Note-taking forces you to commit observations to writing. It's not unusual to find that a seemingly insignificant item at a scene later becomes a key point in an investigation.

Accurate and thorough note-taking at a crime scene can be critical to the resolution of the case. Case notes help you in writing the final report. Case notes also serve as a reminder of the intricate details of the case in court. Case notes support your observations and conclusions.

Notes should detail actions taken, observations made, and items of evidence collected at the crime scene. Write them in a clear and legible manner so you can't misinterpret them in the future.

You should include the following items in your case reports:

1. CR#, date, and crime/type of report
2. Addresses of scenes or locations of examinations
3. Arrival times. Serious crimes or cases with multiple scenes will include the time you cleared the scene.
4. Scene description
5. Contacts (individuals who provided information) and what they told you
6. Items of evidence collected
7. Items and areas processed for latent prints and/or DNA and number of latent cards collected
8. Processing techniques used
9. Presence or absence of shoeprints, tire tracks, and tool marks
10. Sketches (POE's, locations of evidence, or observations)
11. Measurements
12. Weather conditions, room temperature, lighting (when applicable)

Items 9-12 are included on a case-by-case basis.

You can discard your notes once the report is finished. You must attach to your report your original rough sketches of a scene with measurements for a "to-scale" diagram.

B. Photographs

Once a crime scene is secured and you've taken your preliminary notes, you can start photographing the scene. Photography is a valuable tool for recording crime scenes and

explaining evidence to others. You should take photographs to clearly and accurately depict the scene as you found it.

It's best to use a three-step approach when photographically documenting a crime scene: take overall, midrange, and close-up photographs.

1. Take overall photographs before moving any evidence or placing evidence markers. The purpose of overall photographs is to enable others to visualize the scene as you discovered it.
2. Midrange photographs further establish the location of evidence and the relationship of evidence and items in the crime scene.
3. Take close-up photographs to show the details of evidence at the crime scene. Place a scale in all close-up photographs.

Using this three-step approach will normally provide a complete photographic documentation of the crime scene and its related evidence.

C. Videography

While you can do videography of a scene either before or after still photographs, it most often comes first. Videography provides a 360° view of the crime scene. It's most valuable when used as a visual aid for trial juries. It provides a more realistic view of the crime scene so juries can get a better picture of the true nature of a crime.

Turn off all sound recording when recording video of a scene. All personnel and vehicles not part of the scene should leave the area prior to the start of the recording. Like photographs, video should also include overall, midrange, and close-up shots. You can place evidence markers in the scene prior to recording, or take two shots, one without and one with markers. Include the surrounding area (streets, exterior of buildings, etc.). When inside rooms, take two different overall shots from opposite corners of the room. As you record each item of evidence, try to obtain close-up shots of the items. Avoid long, lingering shots of the victim at homicide scenes; a slow pan across the overall body followed by close-ups of injuries should suffice. If possible, record a 360° view from the location of the victim.

D. Sketches

The main reason for sketching a crime scene is to provide a visual portrayal of the location of evidence at a scene in a clear, measurable way, and to show distance relationships between items and areas of interest. A sketch will allow you to specifically locate items of evidence in a scene for investigations and court. Although photographs should depict the story of what happened in detail, a sketch provides an overall image of the scene. Major crime scenes (homicides, shootings, stabbings, etc.) require to-scale diagrams. You may complete to-scale diagrams and rough sketches when you feel they may aid an investigation.

There are several different styles of sketches.

1. An *overhead sketch* is the most common type of sketch. It gives the reader a "bird's-eye view" of the crime scene or a portion of the crime scene.
2. An *elevation sketch* is used when the vertical rather than the horizontal is of interest. For example, if bloodstains or bullet holes appear on a wall, the elevation drawing of the wall would depict this part of the scene.
3. An *exploded-view sketch* is a combination of the preceding two types. It's similar to the overhead sketch, except that the walls are folded down into the same plane as the floor.

4. The *perspective sketch* depicts a three-dimensional drawing of the scene. This is the most difficult type of sketch to draw; however, you can show trajectories in this type of sketch.

You can use several location methods in a crime scene sketch. The *coordinate method* and *triangulation method* are the most common.

1. The *coordinate method* measures evidence from two fixed points and at right angles to one another.
2. The *triangulation method* is most useful at outdoor scenes where distinct edges aren't easily identifiable. Choose at least two objects as reference points. Measure the item of evidence from a straight line to each reference point, forming a triangle.

It's important to keep the objects in a crime scene sketch in proportion to one another. You must identify all relevant items of evidence individually or in a legend. Always include an arrow showing north on the sketch.

You can record measurements using a ruler, roll-a-tape, steel measuring tape, or an electronic measuring device. Select fixed reference points (such as light poles, fire hydrants, or curb lines) when possible. The City of Buena Park shouldn't have any areas that can't be sketched using the tools available to the FSU.

Forensic specialists don't make sketches for traffic accident reconstruction. Sketches for traffic accident reconstruction require specialized training and aren't a service provided by the FSU.

For further details, refer to BPPD Policy 406, Crime and Disaster Scene Integrity.

E. Collection of Physical Evidence

If you've been called to a crime scene, then the collection of physical evidence at the scene falls on you. You should tell the Lead Detective or on-scene supervisor about any assistance you need to collect physical evidence.

You must wear protective gloves to protect evidence from cross-contamination, fingerprints, and DNA, as well as to protect Department personnel from biohazards. Change gloves when you process items from different suspects or different areas of a crime scene. Collect and properly dispose of used gloves.

You should mark and photograph physical evidence before collection and package it appropriately based on the nature and condition of the item. Mark items in such a way as to not damage or contaminate the evidence. You should place items that can't be marked in an appropriate container, seal it, and label the container. Note special packaging needs (i.e., fragile, sharps, biohazard) on the packaging and in the related report for future reference.

Describe items fully, including make, model, and serial number, if any. You should also document the location recovered from, any movement of the item prior to recovery (i.e., moved by medics or officers to allow treatment of a victim), and possible contamination due to the movement.

At your discretion in some circumstances, you can collect control samples from areas where physical evidence is recovered to allow for the identification of substances and comparison of these with the known source sample. Damage from tool marks to the surrounding structure (i.e., wood, metal, paint, and glass) at a point of entry can leave residue on the tool that you can compare to the known source sample. Glass particles, paint transfers, and soil or organic matter

often appear at the scene, and comparing these with a control sample allows you to confirm or eliminate suspects/subjects from a crime scene.

Any item recovered by another individual and transferred to you for processing or booking should include the location and time recovered, and the name and ID number of the individual for maintaining the chain of custody.

F. Safekeeping

The procedure for the proper collection and transport of safekeeping items is different from items collected for evidence. Keep in mind that the status of an item as safekeeping or evidence is subject to change. Items collected for safekeeping may be determined to be evidence after further investigation, or may be related to another case. As such, it's better to treat all items collected as evidence to protect it.

Items that you collect for safekeeping purposes only, and that you determine are not evidence of any crime that would require further evidence processing, require gloves only when you consider it necessary for your protection. You don't need packaging to protect these items from cross-contamination, but you may need it to contain the item(s).

V. ALTERNATIVE PHOTOGRAPHY TECHNIQUES

A. Introduction

From documenting a traffic accident to recording the detail of a bite mark, photographs can communicate more about crime scenes and the appearance of evidence than can the written report. Photography is a valuable tool for recording the crime scene and explaining evidence to others.

Photographs must be accurate representations of the crime scene and evidence. To achieve this, photographs must be good technical photographs. Good technical photographs must be correctly exposed, have maximum depth of field, be free of distortion, and be in sharp focus.

B. Exposure

Correct exposures are necessary to capture detail in all parts of a scene. Underexposed images generally lose detail in the shadows, while overexposed images lose detail in the bright, well-lit areas.

A digital camera controls exposure automatically when it's in *program mode*. When the camera is in *manual mode*, you control the shutter speed and lens aperture.

While the camera is able to adjust to most lighting conditions in program mode, you can use the histogram to verify that an image was properly exposed. Adjust the camera's shutter speed and aperture to compensate for unusual lighting conditions.

Depth of field is the area in a photograph in which objects are in sharp focus. In crime scene and evidence photography, depth of field is usually controlled by *f-stop selection*. For example, the smaller the lens opening (e.g., f/22), the greater the depth of field, and the larger the lens opening (e.g., f/2.8), the smaller the depth of field. The smaller the f-stop, the less light gets into the lens, so either lighting or shutter speed need to be adjusted to compensate. Other factors that may

affect depth of field include the focal length of the lens and the distance from the camera to subject.

You should use a smaller lens opening when photographing tool marks, fingerprints, and other small pieces of evidence that require extreme close-up (*macro*) photography.

C. Focus

Technical photographs must be in sharp focus. To accomplish this, keep the camera steady. Use a tripod if the shutter speed is less than 1/60 of a second. Always use a tripod when photographing impression evidence, such as shoe or tire tracks. Always focus carefully and use the maximum depth of field. Use manual focus for timed exposures and for macro photography.

After you capture each image, review the image and the histogram on the LCD panel on the back of the digital camera. The LCD panel has the ability to zoom in on an image to determine sharpness. To use this feature, press the "play" button next to the LCD. Use the magnifier buttons (top-right corner of the back of the camera) to zoom in and out. To move right or left, use the **<◄/►>** keys to move in the desired direction.

D. ISO

The digital cameras have ISO settings. The ISO setting controls the light sensitivity of the sensors that record an image. With our digital cameras, you should use the ISO setting of 400 for most photography. The exception is very bright exterior scenes; for these, you should set the ISO to 100 or 200. You should avoid setting the camera to an ISO higher than 400 as it can produce "noise" in a digital image. In fully automatic mode, the camera will set the ISO automatically.

E. Flash

You can accomplish flash photography in several ways. The digital cameras have a built-in pop-up flash unit. This flash is adequate for shooting the inside of vehicles and objects at a range of less than 10 feet. Beyond a distance of 10 feet, attach a Canon Speedlite flash unit to the camera. The Speedlites use ETTL metering to determine the amount of light to use in a flash. The Canon Speedlite 580EX is the primary flash. Two Canon Speedlite 420EX flashes are available as backup.

The Canon Speedlite 580EX has a maximum outdoor range of 39.4 – 49.2 feet and a maximum indoor range of 26.2 – 32.8 feet. To achieve a maximum flash distance for photography of outdoor scenes at night, set the flash output level to overexpose by 3. Then set the camera to manual, with an aperture of f/2.8 and an exposure time of 1/125 (the flash sync speed).

The 580EX comes with built-in catch light and wide panels. The catch light will help to better illuminate portrait photos. Tilt the flash head when photographing highly reflective surfaces at close range or when photographing injuries. The wide panel will disperse the flash, decreasing the chance of having a dark periphery in photos.

F. Oblique Lighting

Oblique lighting uses a light source at a low angle of incidence relative to the surface being photographed. It's commonly used when photographing impressions, such as shoe prints or tire tracks. You can create oblique lighting using various light sources, such as flashlights.

Oblique flash is the most common method used in shoe print or tire track photography.

1. Place the camera on a tripod.
2. Connect the off-camera shoe cord to the top of the camera and attach the other end to the 580EX flash unit.
3. Hold the flash at a low angle of incidence to the surface you're photographing.
4. Take the picture.

In a pinch, you can create oblique lighting with a flashlight.

1. Place the camera on a tripod.
2. Set the camera to "Bulb" setting or timed exposure (see below).
3. Hold a flashlight at a low angle of incidence to the surface you're photographing.
4. Using the wireless remote shutter release to avoid camera shake, expose the photo sufficiently for the lighting conditions.
5. You may need to take a series of bracketed exposures.

G. Aerial Photography

When taking aerial photographs, you must set the shutter speed 1/500th to avoid camera shake from the helicopter's vibration. You can ask the pilot to take off the helicopter doors so you can have an unobstructed view. Depending on weather conditions, you can use ISO 100 or ISO 400. Before taking off, be sure that all your equipment is secure. Don't take aerial photographs on a foggy or hazy day or late in the afternoon because of the low light conditions.

H. Painting with Light/Timed Exposures

Timed exposures and painting with light are photographic techniques used in night photography of outdoor scenes. These techniques are especially effective when the scene extends over a large area. They should be used at all outdoor major scenes and fatal traffic accidents.

The goal of timed exposures and painting with light is to produce overall photographs that would normally not be visible with the existing lighting conditions or with standard night flash photography. For example, you can't adequately photograph with one "pop" of the strobe a crime scene that includes several vehicles in a street. The timed exposure/painting technique will illuminate the scene in such a way as to make the scene appear almost as if it were daylight. To use this technique, follow these steps.

1. Timed-Exposure Technique
    a. Place the camera on a tripod.
    b. Set the camera to "manual" mode.
    c. Set the lens to its widest setting, 18mm, and focus the lens manually.
    d. Set the aperture to a setting between f/8 and f/2.8. **Remember, the smaller the aperture, the longer the exposure needs to be.** Also, remember that depth of field is controlled in part with the aperture setting.

To obtain optimal exposure and depth of field, you must evaluate the lighting conditions and subject matter within the scene. Based on these factors, you can set an aperture and exposure. For example, for a parking lot with standard lighting and no evidence in the immediate foreground (10-15 feet in front of the camera), a setting of f/4 and an exposure of 3-5 seconds will probably be adequate. The settings will vary based on lighting conditions. You should experiment with the settings and use the digital camera's instant-viewing ability to determine the best settings.

If you're going to illuminate shadows in a timed exposure, you should use the painting-with-light technique. With a digital camera, this usually requires assistance of another person and can be accomplished by following these steps.

2. Painting-with-Light Technique
    a. Place the camera with flash on a tripod.
    b. Set the camera to manual mode.
    c. Set the lens to its widest setting, 18mm, and focus the lens manually.
    d. Look through the camera's viewfinder and determine the edges of the scene. Take the 580EX flash unit and turn it on. Walking quickly along the edges of the scene depicted in the viewfinder, pop the flash in the direction of the shadow areas. Never pop the flash in the direction of the camera.

You may only have several seconds to accomplish this based on the camera's exposure setting. If you have many shadows to illuminate, you may want to have a smaller aperture and longer exposure time. You can also use multiple assistants with multiple flash units. Setting the camera to "Bulb" will allow you to close the shutter when you have finished lighting the scene. However, if there's enough ambient light, this may result in an overexposed photo.

I. Examination-Quality Photography

Examination-quality photographs, sometimes called evidence photographs, are those taken in the manner that best records the maximum amount of detail. Timed exposure used for fluorescent friction ridged skin is "B", Bulb mode. This detail is necessary so t these photographs can be used in scientific comparisons.

Tire tracks, shoe prints, bite marks, fingerprints, and tool marks are all examples of items that may need to be photographed for comparison. You should try to use a tripod, angle finder or bubble level, a scale, and a macro lens when taking examination-quality photographs.

Using a tripod ensures that the camera plane is parallel to the evidence being photographed. A tripod also serves to steady the camera and allows for oblique lighting techniques to be used.

An angle finder or bubble level will make certain that the film plane is parallel to the target surface. You **must** use a scale for the photograph to be sized to 1:1. The scale must be parallel to the subject and must be the same length as the subject matter. For small items such as friction ridge detail, bite marks, and tool marks, use the digital camera's macro lens.

1. Bite marks: Use a small "L" scale. Take overall and close-up photographs of the bite mark. Keep the camera parallel to the bite mark.

2. Tool marks: Take overall photographs to show the orientation of the tool mark. Take close-up photos parallel to the tool mark, and include a small "L" scale.

3. Friction ridge detail: Take overall photos of the surface that contains the friction ridge detail. Take macro photos of the friction ridge detail and include a scale. The scale must cover the same length as the friction ridge detail for proper 1:1 sizing by the latent section. Keep the camera level and parallel to the detail.

When photographing fluorescent friction ridge detail in the field using the ALS, you must darken the room where the print is located. You must also place a filter, usually orange, on the camera lens. Take photos using a timed exposure. Place the camera on the tripod and follow the instructions for timed exposures listed above ("Painting with Light/Timed Exposures"). Use the digital camera's LCD zoom features to zoom in on the ridge detail. Examine the detail to determine focus quality and proper exposure.

4. Shoe prints:
   a. After identifying the impression you wish to photograph, place a linear scale next to and on the same plane as the impression.
   b. Place the camera on a tripod and position it directly over the impression if feasible to do.
   c. Adjust the height of the camera so that the impression and scale fill the frame.
   d. Use the oblique lighting technique. Block out any bright ambient light to maximize the effect of the oblique lighting.
   e. Use the wireless remote shutter release to prevent movement of the camera during exposure.
   f. Focus the camera on the bottom of the impression, not on the scale.
   g. Using the shutter release, hold the flash 4-5 feet from the impression, and carefully aim the flash evenly across the surface of the impression at the time of the exposure.
   h. You should take a minimum of four exposures each impression.

5. Tire tracks: The photography of tire tread impressions is very similar to that of footwear impressions, with several additional steps that will allow for the photographic reconstruction of the entire track mark.
   a. Each impression must be marked with a letter or number and photographed from a distance with the marker showing in the photograph.
   b. You must place a long metal tape measure on the ground parallel to the portion of the impression that you're photographing. This metal tape will be used later to sequentially align the individual photographs that you take of the impression.
   c. Place a camera mounted on a tripod over the impression. You must orient the camera so that the long axis of the tread is aligned with the long axis of the camera's viewfinder.
   d. Place a scale with finely divided markings adjacent to and on the same plane as the bottom of the impression.
   e. You must place a label in the photo identifying the letter or number marker assigned to the particular track.
   f. You should take the photograph using oblique light, similar to the method used for photographing three-dimensional shoe print impressions.
   g. Move the tripod and finely divided scale into position for the next photograph. Place the sequence number on the identifying label.
   h. Don't move the metal tape during the photography process.
   i. Slightly overlap the individual photographs to allow for a total reconstruction of the track mark.
   j. When done shooting photos, cast the tire tread impression with dental stone. Use the same identifying information used for the photograph of that segment for the cast.

VI. DIGITAL IMAGING: DOWNLOAD AND STORAGE

A. Procedures

Evidence.com is the current system for storage of digital images. All images shall be stored in Evidence.com.

***Never* delete images from the compact flash card. All images taken are to be left on the memory card until downloaded for storage.**

Upload digital images to Evidence.com as soon as practical after your return to the FSU. Upload images in their original, unaltered state from the camera's storage media before the end of your work shift. In the case of a call-in, upload the photos before going off-duty.

B. Photos from Officers

Officers are responsible for downloading photographs they take.

C. Photos from the Public

Due to the unpredictable nature of law enforcement events, digital images from the public/witnesses/suspects may need to be included as evidence. Collect the storage media and book it into BPPD Property. Upload any files on the storage media according to BPPD Policy 814, Computers and Digital Evidence.

Complete a report noting the images associated with the crime or incident and whether the images were entered into Evidence.com. Make a note in the report that Department personnel did *not* take the images.

D. Evidence.com Unavailable

If Evidence.com isn't available due to maintenance or periods of non-operational status, the following temporary storage shall apply.

1. You will either download images to a CD or into your assigned, secure "H" drive.
2. All others shall download images into their assigned, secure "H" drives.

Upon service restoration, transfer the images from the CD or temporary storage location to Evidence.com.

E. Use of Digital Images

No alterations of original images will be allowed. Evidence.com does not allow for any enhancements of photos.

F. Chain of Custody

You must maintain a chain of custody for digitally recorded photography or videography. For digital images, the chain of custody should document the identity of the personnel who had custody and control of the digital image file from the point of capture to archiving. Once the file

has been archived, the chain of custody should document the identity of the personnel who had custody and control of the archived image.

VII. BIOLOGICAL EVIDENCE

A. Purpose

Physical evidence at crime scenes can assist in establishing elements of the crime, help to identify or eliminate a suspect, and can be used to corroborate or dispute the statements of principals. The evidence most often encountered in crimes against person's cases can often include biological evidence. Therefore, its collection is crucial at every crime scene.

B. Background

Biological evidence includes blood, hair, saliva, semen, and other body fluid stains. Any of this evidence may be important and should be collected. As you collect biological evidence, you should also collect a control sample from an unstained area near the collected stain. A forensic light source (e.g., ALS or Blue Light UV) may be of assistance in locating biological stains.

All biological evidence is subject to deterioration. The careful collection and storage of this evidence will help ensure the preservation of this evidence so that we can obtain useful information from its analysis. The pattern of bloodstain evidence may sometimes contain important information. If you determine that the bloodstain pattern is important, you should document it with appropriate sketches and photographs.

Finally, biological evidence can contain infectious organisms (e.g., hepatitis virus, etc.) that can be transmitted to any person who contacts it. For these reasons, it's important that you take proper safeguards to ensure your safety and that of all other personnel. Always treat these types of evidence items as **hazardous**.

C. Method

1. Safeguards while handling biological evidence include:
   a. Wear disposable (e.g., latex) gloves and a mask.
   b. Keep any contaminated surface (e.g., gloved hand) away from your face to prevent contact with mucosal membranes (e.g., eyes, nose).
   c. After dealing with evidence, properly dispose of gloves and mask, and most importantly, wash your hands with germicidal soap.

2. Goals of biological evidence collection.
   a. Collect as much sample as possible from a single source.
   b. Prevent contamination. Ensure that you don't inadvertently mix the sample with other biological samples.
   c. Don't talk over any biological evidence sample.
   d. Handle the sample in a manner that minimizes deterioration of the sample.
   e. Air-dry the sample as fast as possible.

3. Collecting biological evidence stains.
   a. Handle the evidence stains as little as possible.
   b. If a stain is located on clothing or other fabric (e.g., bedsheet), collect the item and dry it using the laboratory biohazard dryers. Collect swab samples from the stains and

submit them for analysis. If it isn't possible to collect a swab sample from a stain, submit the entire item.

c. If the stain is on a smooth, non-porous surface and can be easily dislodged, protect it from contact with other objects (e.g., immobilize in a box).
d. If the stain is on a large object with a porous surface (wood or carpet), you can cut out the area with the stain and package it in paper. Be sure to include a larger portion of the unstained material.
e. If it isn't possible to collect the object or cut out the stain at the scene, you may collect the stain by using a **slightly moistened** (with 1-2 drops distilled water) cotton swab. While collecting the stain, make an effort to **concentrate it onto a small area on the swab**. . Allow the samples to air-dry, then package them in appropriately marked paper envelopes or folded paper bindles.
f. Small biological evidence stains (e.g., 2mm size bloodstain) may need special handling. Put on a fresh pair of gloves before collecting these small stains.
g. If you can't take the object with the stain, a swab is the best sample collection device.
h. If these stains have to be collected by using a tool, consider using new, disposable implements (e.g., new razor blade, disposable pair of tweezers).

Try to minimize the amount of time a stain is kept wet. Air-dry all wet stains as soon as possible. Do **not** expose samples to heat or sunlight in an attempt to dry the stain. You can use laboratory swab dryers and biohazard dryers to dry swabs and clothing items.

4. To avoid contamination, take extra care during evidence collection.
   a. Don't allow one evidence stain to contact other biological samples. Minimize contact with the sample.
   b. Don't talk over a biological evidence sample.
   c. Change gloves prior to collection of biological evidence.
   d. Change gloves often when collecting numerous samples.
   e. Collect and package each individual stain separately.
   f. Don't allow evidence samples to contact any surface that contains residue from another biological sample (e.g., dirty tweezers, bloodstained glove, contaminated work surface).
   g. Use single-use, disposable tweezers, or tweezers that have smooth, easy-to-clean working surfaces.
   h. You can clean tools (e.g., tweezers, scissors) by thoroughly rinsing them with a stream of distilled water followed by soaking or rinsing with a 10% bleach solution.
   i. Package all biological evidence in paper bags or envelopes. Do not use plastic**.**
   j. Allow stains to air-dry as much as possible before placing them in a paper bag or envelope.
   k. Package the unstained control sample separately from the evidence stain.
   l. Package different evidence items in separate paper containers.
   m. Ensure that the paper container is large enough to allow air circulation around evidence item.
   n. You can place clean paper on (or in) a bloodstained garment and fold the garment so that the paper prevents contact between different stains. Ensure that the stain patterns aren't altered or the stain isn't cross-contaminated with another wet stain while items are drying.
   o. Tape seal, initial, and date all packages.
   p. All samples with biological evidence are to be stamped with "FREEZE", then placed into a freezer or refrigerator.

VIII. FIBER AND HAIR EVIDENCE

A. Purpose

Many crimes involve direct physical contact between victim and suspect. Whenever such contact occurs, there is frequently an inadvertent transfer of microscopic evidence. This evidence transfer usually involves hairs and fibers. However, this type of evidence, which can be microscopic in form, may often be overlooked by investigating officers because it's not easily observable. Even though the most commonly encountered fibers are white and/or blue polyester, cotton, or blends of these, you should collect and submit this type of evidence for evaluation.

B. Background

These types of crimes usually involve personal contact of some sort. Therefore, fibers and hairs may be interchanged between victim and suspect and/or their respective environments and apparel. Weapons and fingernail scrapings also may be important sources of fiber evidence. Bindings, such as rope, may also leave distinct fibers if a person was tied up.

Burglary: You may find clothing fibers at the point where a burglar may have been forced to crawl through a window or other opening. If the burglar used no head covering, you may also find hair.

Hit-and-Run: Due to the forceful contact between victim and vehicle, you can generally find clothing fibers and hair adhering to the fenders, grill, door handles, undercarriage, or other parts of the vehicle. You may also see fabric impression patterns on surfaces with which the fabric may have impacted.

Rape: Due to direct contact between victim and suspect, you may recover clothing fibers and hair from the suspect and the suspect's clothing.

C. Method

Before attempting specific procedures listed below, note the following general precautions.

1. The size of container should correspond to the size of the object.
2. Do not package wet evidence. Air-dry fibers or objects containing fiber evidence before placing them in appropriate containers. BIOLOGICAL MATERIALS (SUCH AS HAIR) DEGRADE WITH TIME. THIS PROCESS IS ACCELERATED WHEN ITEMS ARE WET AND SEALED IN AIRTIGHT CONTAINERS SUCH AS PLASTIC BAGS. BIOLOGICAL MATERIALS SHOULD BE STORED FROZEN.
3. Do not wrap exhibits on a tabletop without first thoroughly cleaning that surface. Avoid cross contamination between all evidence and control samples.
4. Label all evidence containers with appropriate information, such as the submitter's initials, case or exhibit number, source, and date, to document the chain of custody.

D. Collection

1. From objects
   a. Note location and the number of fiber/hairs.
   b. Document by photographing the location of fiber/hair and the object it adheres to.

c. Collect the evidence using single-use tweezers or tape lift. When using tape lift, place tape onto a sheet of acetate.
d. Package evidence in a paper envelope or folded paper bindle.
e. Whenever possible, collect the object from which you recovered the fiber/hair.

2. From clothing
   a. Fiber/hair might be present on the victim's clothing. Therefore, if possible, examine clothing at the scene.
   b. If a victim is deceased, you would need to get approval from the coroner investigator to collect any hair or fibers. Typically, any evidence on a decedent is collected by the Orange County Crime Lab Criminalist.
   c. Perform evidence collection without disturbing other potential evidence, such as blood, semen, dust, and soil.
   d. Collection of fiber/hair should follow section "D. Collection 1. a-e" as described above.
   e. If clothing was wet, allow it to dry prior to packaging inside a biohazard locker.

3. From a vehicle or house interior
   You can recover fiber/hair from seats, floorboards, floor mats, trunk, furniture, and carpet. The evidence might be collected using tape lift, collection lifters, or the Sirchie evidence vacuum.

E. Tape lift/collection lifters

1. You can use tape lift or collection lifters by pressing the tape or lifter repeatedly over the area being examined. Place the sticky side of the tape or lifter on top of a sheet of clear acetate.
2. Document each area the evidence been collected from (e.g., front passenger seat).

F. Evidence vacuum

1. You can use the evidence vacuum by vacuuming the area you're examining.
2. Remove the protective cap from front of filter chamber (the end not covered by the actual filter paper) and attach the crevice tool.
3. Remove caps from the back of the filter chamber (the end containing the filter paper) and from the vacuum.
4. Attach filter chamber to the vacuum. If you're using the hose, attach the hose directly to vacuum, then attach the filter chamber to the hose.
5. After you have vacuumed the examined area, immediately replace the caps on the filter chamber to protect the collected evidence. You can then package the filter chamber.
6. Document each area the evidence been collected from (i.e., front passenger seat).

NOTE: *Collect known standards of hair from suspect(s) for comparison purposes. You should reference known standards under the "findings" section of your report in order to make the handling detectives aware in case a suspect is apprehended at a later time.*

G. Fingernail scrapings/clippings

1. Take scrapings from the suspect and, if possible, from the victim.
2. Use a clean instrument, such as individually wrapped toothpicks or cuticle sticks.
3. Use a separate folded paper bindle for each hand to collect scrapings.
4. Place the folded, labeled bindle in an envelope.

H. Collection of control specimens

The collection of control specimens of fiber and hair is an important part of the forensic exam.

1. Fiber controls
   When the investigating team has collected fibers, it's imperative that they also submit appropriate and adequate control specimens. This could involve multiple control samples, such as front and rear vehicle carpets. A control sample about the size of a quarter ($0.25) will usually suffice.
2. Hair Sample Controls
   Whenever you collect hair, include the roots because they can yield considerable information. The preferred method of sample collection is this order: (1) pulled hairs, (2) backcombed hairs, and/or (3) close cutting. It's good practice that hairs should be representative of the left temple, right temple, crown, and the base of the neck. Submit at least 15-20 hairs from each area.

   You should record the overall color of the subject's hair (e.g., gray, red, brown, etc.), his/her age, and any signs of hair treatment when possible. Take samples of each color for comparison purposes.
3. Animal Hairs
   Comb and pull 50-100 hairs (pulling is again preferred as roots are needed for species identification in some animals). Pull hair from the head, back, tail, and underbelly of animals. Label each sample appropriately. All samples must include the coarse guard hair and fine fur hair. If the animal is multi-colored in patches or stripes, obtain samples from all major color areas.

I. Sexual Assault Investigations

There's direct contact between suspect(s) and a victim when a sexual assault occurs. During this contact, the transfer of fiber, hair, and DNA evidence is very likely. It's imperative that you process the suspect(s) in a rape investigation as soon as possible. Forensic specialists only process male suspect(s) of sexual assault cases; specially trained forensic nurses examine female suspect's and victim(s) at a hospital. Furthermore, in most cases, forensic specialists don't process the victim's belongings and clothing; the investigating officer or detective collect and book them into property. These steps are put in place to ensure there's no possibility of cross-contamination during the forensic investigation.

1. Suspect processing
   You will use the 'Suspect Rape Kit' obtained directly from the OCCL for your collection of fiber, hair, and DNA evidence. You should use a disposable surgical mask during the process.
   a. Ask and note if the suspect has taken a shower or changed clothes, and when that took place.
   b. Have the suspect stand on a large sheet of white evidence paper (included in rape kit).
   c. Photograph the suspect fully clothed, facing in all four directions (front, left, right, and rear view). Also, take a close-up photograph of the suspect's face for identification purposes.
   d. Take separate swab samples from both hands, concentrating on the suspect's fingers. Package and label properly.

e. Take separate fingernail scrapings from both hands using individually wrapped toothpicks or cuticle sticks. Package and label properly.
f. Take buccal swabs from suspect to serve as standards.
g. Collect clothing one piece at a time and place each piece in a separate paper bag.
h. Re-photograph the suspect nude, facing in all four directions.
i. Make sure to photograph any injuries (i.e., scratches, scrapes, bruising, etc.) present on suspect, including face and both sides of the hands. Use a scale for all photos.
j. Collect swab samples from penis (head, shaft, and base).
k. Collect evidence paper.
l. Fill out the information form (included in the rape kit).

Properly package each evidence item (swabs, clothing, etc.) in separate, labeled envelopes or paper bags. Examine and process clothing items in the lab using ALS prior to booking. Store all items frozen.

IX. REAGENT PREPARATION

The FSU uses a variety of chemicals during the processing and collection of evidence. Several of these chemicals need to be mixed or prepared in advance prior to field or lab use. This section outlines the preparation of the following chemicals.

- Bluestar
- Ninhydrin
- Sticky Side Powder
- Sudan Black

A. Bluestar

1. Materials. The Bluestar kit contains the following items:
   a. 3 catalyst tablets
   b. 500 mL of reagent
   c. Fine mist spray bottle

2. Mixing Instructions
   a. Place tablets into the bottle containing reagent.
   b. Mix well until tablets are completely dissolved.
   c. Unopened Bluestar has a shelf-life of 3 years. The mixed solution must be used within 24 hours.

3. Validation
   Spray the solution on an area that you know has been contaminated with blood. Look for a bluish luminescence.

B. Ninhydrin

1. Materials
   a. 6.25g Ninhydrin crystals
   b. 1 L acetone
   c. Beaker
   d. Magnetic stirrer
   e. Funnel
   f. Brown glass bottles

2. Mixing Instructions
   a. Pour 1 L acetone into a glass beaker.
   b. Add 6.25 g Ninhydrin crystals and mix with magnetic stirrer until crystals are dissolved.
   c. Pour the solution through a funnel into brown glass bottles.

3. Validation
   Validate the solution by placing a test print on a surface and processing it prior to using the solution on actual evidence.

C. Sticky Side Powder

1. Materials
   a. Sticky Side powder
   b. Water
   c. Photo-Flo 200
   d. Small jar or beaker

2. Mixing Instructions
   a. Place approximately equal amounts of water, Photo-Flo 200, and Sticky Side powder into a small jar or beaker. It should be the consistency of thin paint. You can add more liquid or powder to make the mixture thinner or thicker as the need dictates.
   b. Mix a total volume suitable for the application.

3. Validation
   Validate the solution by placing a test print on a surface and processing it prior to using the solution on actual evidence.

D. Sudan Black

1. Materials
   a. 1 L glass beaker
   b. Plastic stirring rod
   c. 0.5 L denatured ethanol
   d. 7.5 g Sudan Black powder
   e. 250 mL distilled water
   f. Brown glass bottle

2. Mixing Instructions
   a. Place 7.5 g of Sudan Black powder in a 1 L glass beaker.
   b. Add 0.5L denatured ethanol and stir with a plastic stirring rod.
   c. Add 250 mL distilled water and stir with a plastic stirring rod.
   d. A black working solution will result. Some of the Sudan Black will not dissolve. Some will remain as particulate matter floating in the solution or will appear as sediment.
   e. Pour the solution, including any solid matter, into a clean glass bottle with a tight-fitting screw cap. Label appropriately. Solution has an indefinite shelf life.

3. Validation
   Validate the reagent by placing a test print on a surface and processing it prior to use on actual evidence.

X. LATENT PROCESSING

The collection and preservation of fingerprints is a primary source of identification of suspects and the elimination of victims and non-involved subjects at a crime scene. The proper techniques for the collection of fingerprints varies based on the location, surface, and conditions where the fingerprint(s) exist. This section describes the following techniques in detail.

1. Visual Examination
2. Powder Processing
3. Fluorescent Powders
4. Difficult Lifting Techniques
5. Cyanoacrylate Ester (CAE) Fuming
6. Ninhydrin
7. Pre-Ninhydrin DFO Application
8. Post Ninhydrin DFO
9. Wetwop
10. Sticky Side Powder
11. WetPrint (SPR)
12. Sudan Black
13. Laser/ALS Examinations
14. Laser/ALS Photography
15. Blood-Contaminated Print Detail
16. Aqueous Amido Black
17. Leucocrystal Violet (LCV)

You'll use your training and experience to determine which of the above techniques will result in the successful collection and preservation of fingerprints at a crime scene, or for use as elimination prints in an investigation.

A. Visual Examination

1. Purpose
   To detect and record latent print detail for comparison against known exemplar prints.

2. Background
   Prior to the application of any material for the processing of prints, examine all surfaces on the evidence item for visible print detail. You can see the print detail if it was:
   a. recorded in a transparent substance, such as sweat or oil, and is in contrast with a darker background
   b. recorded in dust
   c. recorded in a colored substance, such as blood, ink, grease, or paint
   d. impressed in a soft material, such as wax or putty
   e. the result of a reaction between the fingerprint and a surface, causing the print detail to "etch" onto the surface (i.e., brass)

3. Method
   a. Using a flashlight, ALS, lasers, or other sources of light may help your visual examination of the item or surface for print detail. Examine the surface for visible print detail with the source of light at various angles (i.e., oblique).

b. Photograph or capture any visible print detail.
c. Take precautions to prevent the loss of trace evidence and cross-contamination.

4. Safety
   Wear disposable gloves while handling evidence. This will keep the evidence free from external contaminants on your hands.

5. Casework Application
   Visual examination is required on all items of evidence to be examined for friction ridge detail or fingerprints.

B. Powder Processing

1. Purpose
   Detecting latent prints on semi-porous and non-porous surfaces.

2. Background
   You use fingerprint powders to develop latent prints on semi-porous and non-porous surfaces. The powder adheres to the perspiration/oil residue in the latent print, allowing you to see the ridge detail. The powder-processed print is tape-lifted with a transparent tape and placed on a lift card. The lift card will be a color that contrasts with the color of the powder used (white card with black and bichromatic powder; black card with silver powder). You can photograph or capture the detail before attempting to lift it, if you feel the lifting process may damage the detail.

3. Method
   There are two types of powder generally used in the processing for print detail.
   a. Regular Powder
      1) Black
      2) Silver
      3) Bichromatic
   b. Magnetic
      1) Black
      2) Silver
      3) Bichromatic

   You can use magnetic powders on semi-porous (wood, vinyl, gift wrap, glossy cardboard) and non-porous (tile, ceramics) surfaces. Use regular powders on non-porous surfaces (glass, metals). Determining which powder to use and which color of powder to use is based on the surface examined and your experience.

   The types of brushes used are:

   1. *Fiberglass brushes* for use with non-magnetic powders. They can also be used as a clean-up brush on surfaces or prints that have been over-powder processed.
   2. *Camel-hair brushes* for use as a clean-up brush on surfaces or prints that have been over-powder processed.
   3. *Magna-brush* is a magnetic brush used with the magnetic powders.

   Each of the non-magnetic powders should have a dedicated fingerprint brush. You should use each brush specifically for one color of powder to limit cross-contamination of the

powder colors. In rare cases, contamination of the powders and brushes could inhibit the detection of the print by causing loss of contrast of the print and the surface it is on.

You can lift most powdered prints with fingerprint tape. You can use any commercially made fingerprint tape. We generally use Remco brand transparent tape (with various widths available). The width of the tape used depends on the size of the powder-processed print you're lifting. A wide-area print will require a wide-width tape.

Some surfaces may require the use of a different lifting medium. These can include, but aren't limited to, Mikrosil, Diff lift, and Liqui lift. For more detail on these processes, refer to "Difficult Lifting Techniques".

Place the powder-processed, tape-lifted print on a lift card, which should be a color that contrasts with the powder used to process the print. If you use black or bichromatic powders to process the print, then place the lifted print on a white card; if you use silver powder to process the print, then place the print on a black card.

4. Procedure
   a. Visually examine the surface to be processed for print detail to detect any visible print detail and to determine if surface is wet or otherwise contaminated.
      1) If you observe visible detail, then it must be photographed or captured.
      2) If wet, let the surface air-dry before powder processing, or use SPR (small particle reagent) for processing wet surfaces.
      3) If contaminated, use a reagent suitable for the contaminant in detecting the print. If you're uncertain as to the type of reagent to use, consult with other examiners for direction.
   b. Determine the appropriate powder for the surface (semi-porous or non-porous) you're processing for print detail. If questionable, do a test print on a similar surface or on the surface (away from the area touched by the suspect) and apply powder to the test print.
   c. Apply the powder to the surface.
      1) Regular powders
         a) Lightly apply the powder to the brush. Shake any excess powder off the brush.
         b) Twirl the brush over the surface with the brush bristles/filaments moving in the direction or flow of the ridges of the print. A visual sign of the powder residue on the surfaces of the evidence indicates the powder product is adhering and, therefore, reacting properly.
         c) Powder can sometimes adhere so tenaciously to the surface or contaminate on the surface that it obscures the ridge details. In that case, you can use a "clean-up" brush, or re-lift the print (allowing the tape to pick up excess powder).
            i. "Clean-up" brush: A Zephyr or camel-hair brush that had NO powder applied to it. Twirl or guide the brush to remove the excess powder.
            ii. Keep all cleanup lifts and re-lifts, as some or all may be useful for comparison. Be sure to number all re-lifts as a continuation of the original lift card (i.e., #1, #1a, #1b, etc.) and staple the lifts together.
         d) After developing the print, you may not be able to tape lift the print without damaging the print or the surface containing the print. If that is the case, then the print will have to be photographed or captured.

e) After developing the print, if you feel that tape-lifting the print from the surface will not damage it, then lift the print using fingerprint tape or other suitable lifting medium (Mikrosil, Diff-lift, Liqui-lift, etc.).
   i. Press the adhesive side down firmly, making sure no air bubbles appear in the print or surface.
   ii. Slowly remove the tape, lifting the powder-processed print, and place it on the smooth, shiny side of the lift card.

f) On the printed side of the lift card, make entries in each of the blank spaces as follows:
   i. **CR#:** Enter the case number of the case on each of the lift cards.
   ii. **Crime:** Enter the code and section of case (i.e., PC 211, PC 261, VC 10851, H&S 11357).
   iii. **Location/Position of the print:** Enter in detail the location of the print describing the specific location; for example, “interior surface of the west-facing master bedroom window”.
   iv. **Date** Enter the date
   v. **By:** enter your last name or your first initial and last name followed by your ID number.
   vi. **Number:** Enter the lift number if your lift is a subsequent lift of the same print or when taking multiple lifts from a single item of evidence. You can mark the area of the lift on some items of evidence to show their location.

g) To the right of the lined information on the lift card is an unlined portion. Sketch the location from which the print was recovered. Include an orienting arrow for the sketch.

2) Magnetic powders
   a) Place the non-retractor/plunger end of the wand into the container of magna-powder. Press the retractor/plunger end, activating the magnet. This will attract the powder to the wand, producing a bristle-like end on the wand.
   b) Remove excess powder by tapping the wand against the inside of the container.
   c) Raise the “brush” out of the container and process the surface, taking care that only the ends of the “bristle” touch the print/surface. Guide the “bristle” in the direction or flow of the ridges of the print.
   d) After processing the print, return the wand to the magna-powder container and depress the retractor/plunger end. This will release the powder from the wand, causing it to fall into the container.
   e) You can pick up any excess powder on the processed surface by activating the wand, causing the magnet in the wand to collect the excess powder. The excess powder can be returned to the container if the powder has not been contaminated with liquid, blood, grease, etc.
   f) After developing the print, lift the print and mark it as designated above in “Regular Powders” section; steps “d” through “f” to the end of subsection 6.

5. Safety

For respiratory protection, wear a dust mask when processing with fingerprint powders. Wearing the mask will prevent you from inhaling dust particles and brush filaments that become airborne.

You should wear disposable gloves when handling items you’re processing for latent prints. This keeps the evidence free from external contaminants that interfere with prints.

C. Fluorescent Powders

1. Purpose
   Detecting latent prints on semi-porous and non-porous surfaces.

2. Background
   In 1976, researchers at Xerox Research Centre of Canada discovered that laser light could be used to excite inherent luminescence (fluorescence) in fingerprint residue, making the print detail visible and amenable to photography. It was later discovered that fingerprint residue on semi-porous surfaces (unfinished wood, leather, vinyl) could be processed with cyanoacrylate (CAE) fumes and subsequently processed with fluorescent powders, enhancing the possibility of obtaining fingerprints on these surfaces. In cases involving non-porous surfaces (finished wood, Formica, etc.), using fluorescent powders to obtain fingerprints can be done without first preparing the surface with CAE fumes. Processing with fluorescent powders is usually more useful for reasonably “fresh” latent prints.

   The orange filter material used in laser goggles and filters in laser/ALS examination absorbs the light and permits the fluorescence to be seen and photographed or captured.

3. Method
   There are two types of fluorescent powders used in the processing for print detail.
   a. Non-magnetic
      1) Redwop
      2) Greenwop
   b. Magnetic
      1) Red Blitz
      2) Green Blitz

   Redwop, Greenwop, and Blitz powders are name brands. You may use any commercial fluorescent powders made for fingerprinting use.

   The non-magnetic powders are very fine-grained. A small amount of these powders will go a long way. Feather brushes work well with fluorescent powders. Use the lid of the powder jar to apply the powder to the brush. Gently touch the brush to the lid; the brush will pick up the residue powder adhering to the lid. Don’t put the brush in the jar, as that will over-powder the brush, causing too much powder to be applied to the surface.

4. Procedure
   a. Examine the evidence for inherent fingerprint residue.
   b. You may use fluorescent powders whether or not the surfaces have been CAE processed (at your discretion).
   c. Apply the fluorescent powder to the surface. Use of either the magnetic powder or the non-magnetic powder depends on your preference and experience.
   d. Examine the powder-processed surface with laser/ALS illumination.
   e. If you’re at the crime scene, you should collect the evidence or surface containing the print detail from the scene and bring it to the lab for processing. If you can’t bring the surface or evidence to the lab, do the processing at the scene. Photograph the print

detail (with a macro lens) using a scale, tape-lifted and placed on a black latent card. You can re-photograph the print.

f. If you're conducting the examination at the lab, then you can photograph the processed print detail on the surface and tape-lift the print.
g. Should you want to do sequential processing, fluorescent dye stain solution may follow powder processing on CAE fume-treated surfaces. CAE processing is required on all surfaces to be chemically processed.

5. Safety
   a. You must wear goggles/filter material to protect your eyes from laser light.
   b. Wear a disposable dust mask when using powders.
   c. Wear disposable gloves when handling items to be processed for latent prints, as it keeps the evidence free from external contaminants that interfere with fluorescent prints.

D. Difficult Lifting Techniques

The use of clear tape to lift and preserve powdered latent prints has been in existence for over 100 years. Forensic specialists often develop fingerprints on surfaces that are textured or curved in such a way that makes it difficult for traditional tape to make sufficient contact with the fingerprint. As a result, only part of the ridge detail is lifted, thus making potential subsequent comparison difficult, if not impossible.

The following methods give you a variety of techniques that you can use, depending on the specific surface you're dealing with, to try to lift fingerprint detail in its entirety from a difficult surface.

When you make the decision to use one of these following methods, you've already decided that the powdered fingerprint is difficult to lift without risking damaging the detail. Therefore, you might consider photographing the print prior to attempting to lift it using one of these methods.

1. Using an Eraser on Regular Transparent Tape
   Place regular transparent tape on the powdered target surface. Use a rubber eraser to push the tape into the crevasses of the target surface. Lift the fingerprint and place the tape onto a contrasting fingerprint card. Use a clean eraser; a dirty eraser can scratch the top of the tape.

2. Liqui-lift
   a. Place a drop of Liqui-lift at one end of the powdered latent fingerprint.
   b. Use a canned-air container or a plastic straw to spread the 'rough lift' or 'gel lift' over the fingerprint, making sure to cover the entire surface area of the print.
   c. Wait for the Liqui-lift to dry ENTIRELY.
   d. Lift the print with regular transparent tape and place it onto a fingerprint card. Lifting this material before it is completely dry will damage the fingerprint.

   Leaving the material on the surface overnight won't work because the material will separate from the surface and shrivel up. Drying times will vary with the atmospheric conditions and are frequently more than an hour. In testing, it was found that once the material is dry to the touch and NOT TACKY, the material can be safely lifted.

3. Diff-lift
   Use Diff-lift just like standard fingerprint lifting tape.
   a. Cut a section of the tape to whatever size you need and hand-press the Diff-lift onto a developed powdered fingerprint. For a more effective lift, use a roller to maximize compression into the textured surface.
   b. Lift the latent fingerprint with Diff-lift and place it on a fingerprint card.
   c. Cut the Diff-lift with scissors or a sharp knife. Do not remove the protective covering from the Diff-lift tape.
   d. Once on a lift card, you must tape down both ends of the Diff-lift tape with any other type of tape to protect the acetate cover from inadvertently lifting.

   On many smooth surfaces, the Diff-lift will adhere so strongly to the surface that when it's lifted from the surface, the protective covering separates from the gelatin-like material and will damage the fingerprint. Therefore, you must always test lift an area of the target surface.

4. Poly Tape
   Use poly tape just like standard fingerprint tape. Poly tape will stretch and conform to a variety of curved and textured surfaces. Finger-press the poly tape onto a developed powdered latent fingerprint. Lift the latent fingerprint with the poly tape and place it on a fingerprint card. You must cut the poly tape with scissors or a sharp knife because it's difficult to tear.

5. Gelatin Lifters
   a. When lifting dusted prints, cut a piece from the lifter for whatever size you need.
   b. Use a lifter that contrasts in color with the fingerprint powder you're using.
   c. Before lifting the print, set the cover sheet aside, upside-down, to avoid contamination with dust.
   d. Press an edge of the lifter on a side of the developed print.
   e. Smooth down the lifter while rubbing with your fingers or pressing with a roller to prevent air bubbles from being locked in.
   f. Place the lifter gelatin-side up on a flat horizontal surface to replace the cover sheet.

   When replacing the cover sheet, make sure it's clean and press firmly to remove as many of the air bubbles as possible. A roller may be helpful to remove the air bubbles.

6. Mikrosil Casting Putty (white)
   a. Dust and develop the latent prints.
   b. Prepare the Mikrosil putty. Squeeze out equal lengths, about 1-½" to 2" long, from the two tubes onto the shiny side of a mixing pad or a fingerprint card.
   c. With a wooden spatula, mix the two components together thoroughly on the card.
   d. Scrape the Mikrosil off the mixing card with the wooden spatula and apply it to the dusted fingerprint.
   e. Spread the Mikrosil material over the fingerprint thick enough so as not to inadvertently damage the impression. Also, when spreading the material, press firmly in an attempt to alleviate air bubbles.
   f. When the Mikrosil has set (after approximately 5 to 8 minutes), gently peel it from the surface.
   g. Tape the Mikrosil print to a fingerprint card (don't tape directly over the print, but around it). Staple an additional card over the lifted fingerprint to protect it from potential damage.

h. Remember that the latent prints will be reversed left to right (mirror image).

E. Cyanoacrylate Ester Fuming

1. Purpose
   Cyanoacrylate ester (CAE) is used on semi-porous and non-porous surfaces to prepare (or "fix") a latent print for sequential processing techniques (i.e., black powder or non-fluorescing and fluorescing chemical agents).

2. Background
   In 1978, the Tokyo Metropolitan Police Department first demonstrated the application of CAE for the development of latent prints to the United States Army Crime Laboratory personnel. Since that time, CAE has widely been used for processing of latent prints.

   CAE reacts with water and other residues within the latent print, polymerizes, and produces a white-colored print. You can process the CAE-developed print with fingerprint powders and chemical reagents. You can use heat or chemical acceleration of CAE for maximum fume coverage.

3. Reagent Application Method
   a. Materials
      1) Atmospheric chamber
      2) Beaker or other container containing warm water
      3) Liquid CAE
      4) Hot plate
      5) Foil plate

4. Procedure
   a. Examine the chamber for CAE residue. If you can see residue buildup, clean the chamber, as CAE adheres to itself. If the CAE is adhering to itself, then you aren't getting proper CAE fume coverage. Buildup of residue on the chamber will also prevent you from viewing the amount of residue adhering to the surfaces of the evidence item.
   b. Position (i.e., suspend) evidence items in the chamber so that all surfaces of the item will be exposed to the CAE fumes.
   c. Place one beaker containing warm water (for hydration) in the chamber.
   d. Place a small amount of liquid CAE in a foil cup. Place the foil cup on a heated hot plate. Experience will dictate how much CAE and for what length of time to expose it, depending on the size of the chamber and the items being processed (in general quarter size ($0.25) CAE and 10-15 minutes).

5. Casework Application
   You should process all semi-porous and non-porous items (except beverage cans and glass items[1]) examined in the laboratory with CAE. Exceptions are allowed when you feel that a different process will yield better results based on your training and experience.

[1] CAE processing of cans and glass is left to your discretion. These surfaces need only to be powder processed.

F. Ninhydrin

1. Purpose
   The chemical reagent Ninhydrin is used in the development and recovery of evidence prints on porous and semi-porous surfaces. You compare ridge detail developed by the Ninhydrin method against the subject exemplars for identification. You must photograph developed ridge detail or capture it with a scale. Ninhydrin-developed prints can fade with time and may not be revitalized by additional Ninhydrin treatment. Ninhydrin-developed prints may also be lost due to additional print development methods (i.e., physical developer).

2. Background
   Swedish scientists Svante Oden and Bengt Von Hostem first reported the use of the chemical reagent Ninhydrin for the visualization of fingerprints. In 1954, they co-authored an article in the British scientific journal *Nature*, titled “Detection of Fingerprints by the Ninhydrin Reaction.” The article described the development of latent fingerprints on paper using a well-known test for amino acids frequently used in paper chromatography. Oden and Von Hostem discovered the application when they were analyzing paper; the fingerprints of those who had touched the paper developed.

   Since that time, Ninhydrin has become established as the most versatile of the chemical reagents used. It’s particularly suitable for the treatment of porous and semi-porous surfaces, such as paper and wood.

   The compound Ninhydrin (1,2,3-Triketohydrinden Monohydrate) is dissolved in a suitable organic solvent and reacts with amino acids and related chemical compounds (i.e., proteins). This reaction produces a purple product known as Ruhemann’s Purple. You can photograph the purple-stained developed print detail and use it for comparison and subsequent identification.

   The Ninhydrin currently used in our forensic laboratory is purchased in a premade solution form. However, the solution can still be prepared by following steps described in the Reagent Preparation section. Currently, we are using two types of Ninhydrin solutions; NSI609 (non-smudging solution), which prevents ink from running, and NHT609 (heat transfer), which can be used on carbonless papers, such as store receipts.

3. Method
   Reagent Preparation: see Reagent Preparation section (Section IX)

   Reagent application
   a. Take photographs of any writing or marks on the document prior to processing with Ninhydrin solution.
   b. In the laboratory, you can process evidence by immersion, painting, or spraying the solution.
      1) Immersion: Immerse the evidence in Ninhydrin solution that has been poured into a glass Pyrex dish. Handle the evidence with tongs.
      2) Painting: Pour Ninhydrin solution into a glass beaker or Pyrex dish. Dip a paintbrush into the solution and apply the brush to the evidence. Use only a brush dedicated to applying Ninhydrin solutions.
      3) Spraying: Spray the evidence in a fume hood using a pump sprayer.
   c. Process the evidence with Ninhydrin once.

d. After approximately 24 hours (or longer), digitally photograph or scan the latent detail using a scale to produce a 1:1 image.

Note: you may decide to use a second application of Ninhydrin to try to darken very light ridge detail. You must take photographs prior to the second application due to the possibility of losing ridge detail.

4. Safety
You must wear eye protection, laboratory coats, and chemical-resistant gloves when you're preparing solution. Mix and apply in fume hood or outside. Recap the Ninhydrin bottle immediately after use to prevent cross-contamination and evaporation.

5. Casework Application
This approach is appropriate for cases that have amino acid, protein, or blood-contaminated evidence prints. If an evidence print is blood-contaminated, you must perform serological testing prior to applying Ninhydrin. The Ninhydrin application may interfere with questioned document examination. Take photographs or xerographic copies of any writing or marks on the document prior to processing it with Ninhydrin solution.

Evaporate any unused solution inside a fume hood. Do NOT pour any remaining solution back into the Ninhydrin solution bottle. Rinse the remaining Ninhydrin residue off the glassware with water followed by an acetone rinse. The acetone rinse accelerates drying of the glassware and dissolves the Ninhydrin residue.

G. Pre-Ninhydrin DFO Application

1. Purpose
This method detects latent prints on porous and semi-porous surfaces.

2. Background
In 1976, it was discovered that laser light ("light amplification by stimulated emission of radiation") could be used to excite inherent fluorescence in fingerprint residue, making the prints visible and amenable to photography. In 1984, the UK Home Office Central Development and Research Branch wanted to develop a Ninhydrin analogue that would fluoresce. In 1988, it developed 1,8 Diazafluoren-9-one (DFO).

DFO causes amino acids present in latent residue to fluoresce when illuminated with laser/ALS.

3. Method
Reagent preparation: Solution is pre-formulated with a non-flammable carrier.

a. Reagent application materials
    1) Laser or alternate light source (ALS)
    2) Glass dishes for dipping
    3) Tongs
    4) Heat source
    5) Goggles/filter material
    Each band of wavelength of laser/ALS has a specific type of goggle or filter material. Goggles or filter material allow fluorescence to pass or be viewed, thereby allowing it to be photographed or captured.

6) DFO reagent

4. Procedure
   a. Dip the item in or spray the item with DFO reagent for ten seconds. Allow to dry. Re-dipping or re-spraying the item with a second application of DFO for ten seconds may be required for best results. Allow to dry. Conduct processing under a fume hood.
   b. Heat the item for ten minutes at 100°C.
   c. Examine the item with a laser/ALS for prints. Latent prints on white paper are most commonly viewed through an orange filter at wavelengths of 450nm, 485nm, 525nm and 530nm. Use proper eye goggles for protection and visualization of the fluorescing latent print detail.
   d. If you observe potentially identifiable prints, you must photograph or capture them.
   e. The next step in the sequential processing is to process the item with Ninhydrin.

5. Safety
   a. Wear chemical-resistant gloves when processing with DFO solutions.
   b. You must wear safety glasses when processing with DFO solution, as there's a risk of splashing solution into your eyes.
   c. Wear a lab coat to protect your skin and clothing from chemicals.
   d. Do all processing with and preparation of DFO solution in a fume hood.
   e. You should wear disposable gloves when examining the item, as it keeps the item free from external contaminants that may interfere with your processing examination.
   f. Make sure all items are completely dry before placing them in the DFO chamber. The petroleum ether is highly flammable.

6. Casework Application
   When you attempt to develop fingerprints on porous and/or semi-porous surfaces, start by visually examining the evidence object. Pre-Ninhydrin DFO should be the first reagent application in the sequential processing of an evidence item. Pre-Ninhydrin DFO usually isn't done when processing evidence from less-serious minor crimes.

H. Post-Ninhydrin DFO

1. Purpose
   This method detects latent prints on paper and other porous surfaces.

2. Background
   1,8 Diazafluoren-9-one (DFO), a Ninhydrin analogue, was developed in 1988. An application of DFO solution after Ninhydrin processing of paper can develop additional latent prints or enhance previously raised prints. You can see the visible latent prints in room light. Lightly developed Ninhydrin prints will often times darken, increasing the contrast after processing.

3. Method
   Reagent Preparation: Solution is pre-formulated with a non-flammable carrier.
   a. Reagent application materials
      1) Glass dishes
      2) Tongs or paint brush
      3) Heat source

4. Procedure
   a. Examine and photograph the Ninhydrin-processed prints. Refer to “Digital Fingerprint Recording.”
   b. Dip the item in or spray the item with DFO solution. Allow to dry. Re-apply DFO to the item and re-dry. Conduct processing in a fume hood.
   c. Heat the item for ten minutes at 100°C.
   d. Examine the item for prints.
   e. Photograph or capture any prints you see.

5. Safety
   a. Wear chemical-resistant gloves when processing with and preparing DFO solutions.
   b. You must wear safety glasses when you process with and prepare DFO solution, as there’s a risk of splashing solution into your eyes.
   c. Wear a lab coat to protect your skin and clothing from chemicals.
   d. Do all processing with and preparation of DFO solution in a fume hood.
   e. Wear disposable gloves when you examine the item, as it keeps the item free from external contaminants that may interfere with your processing examination.

6. Casework Applications
   Use your discretion when deciding to apply DFO after Ninhydrin processing of case items.

I. Wetwop

1. Purpose
   This method can recover friction ridge detail from the adhesive side of tapes and other adhesive-backed materials.

2. Background
   When fingers or hands touch the adhesive side of tapes, dead skin cells and body secretions stick to the adhesive. You can’t use dry fingerprint powders since the powder will stick to the adhesive. Mixing a dry fingerprint powder into a solution of water and a wetting agent makes a suitable fingerprint powder solution that you can apply to the adhesive surface. This solution adheres to the fingerprint residue without adhering to or painting the background.

3. Method
   a. Materials
      1) Black or white Wetwop
      2) Small paint brush
      3) Small tray

4. Procedure
   a. Shake Wetwop and pour a small amount into the tray.
   b. Apply the solution to the adhesive material using a brush.
   c. Let stand for at least 15 seconds, then rinse with deionized water and air dry.
   d. Digitally photograph each developed latent print.

5. Safety
   You must wear a lab coat, gloves, and eye protection when using the Wetwop solution.

6. Casework Application
   Each container of Wetwop will be validated when received and every 6 months thereafter. If solution hasn't been validated in the prior 6 months, you must validate it before you use it on casework. You validate Wetwop by placing a test print on an adhesive surface and processing the print.

   If you plan do cyanoacrylate ester fuming on an item, you should fume the item before applying Wetwop.

J. Sticky Side Powder

1. Purpose
   This method can recover friction ridge detail from the adhesive side of tapes and other adhesive-backed materials.

2. Background
   As a result of fingers or hands touching the adhesive side of tapes, dead skin cells are removed and stick to the adhesive. In addition to the skin cells being left behind, body secretions are also retained. The use of dry fingerprint powders is not suitable since the powder will stick to the adhesive. Mixing a dry fingerprint powder into a solution of water and a wetting agent makes a suitable fingerprint powder solution that can be applied to the adhesive surface. This solution adheres to the fingerprint residue without adhering to or painting the background.

3. Method
   Reagent Preparation: See Reagent Preparation section. (Section IX)
   a. Materials
      1) Sticky Side powder solution
      2) Small paint brush
      3) Shallow tray or bowl

4. Procedure
   a. Pour a small amount of Sticky Side powder into the shallow tray or bowl.
   b. Apply the solution to the adhesive material using a brush.
   c. Let stand for at least 15 seconds, then rinse with water and air dry.
   d. Digitally photograph each developed latent print.

5. Safety
   You must wear a lab coat, gloves, and eye protection when using the Sticky Side powder solution.

6. Casework Application
   You must validate each solution of Sticky Side powder prior to using it on evidence. Validate the solution by placing a test print on an adhesive surface and processing the print.

   If you plan do cyanoacrylate ester fuming on an item, you should fume the item before applying Sticky Side powder.

K. WetPrint (SPR)

1. Purpose
   This method detects latent prints on non-porous surfaces.

2. Background
   Small particle reagent (SPR) is a solution of powder particles suspended in an aqueous solution that adheres to the fats and/or oils present in the latent print residue. You use this solution primarily on evidence surfaces that have been wetted or exposed to rain, dew, or fog. You can also use it on surfaces that have a sticky contaminant, such as soft drinks.

3. Method
   Reagent preparation: Solution is pre-formulated.

   Reagent application: Solution should be repeatedly agitated as the molybdenum disulfide continually separates.

4. SPR Procedure (Spraying development for fingerprints)

   a. Place the solution in a sprayer bottle.
   b. Spray the solution on the surface, making sure that the surface is evenly and thoroughly saturated with the solution. Shake the bottle frequently during application to keep the powder particles from separating from the water.
   c. The excess solution will drain off the surface. If needed, you can rinse the surface with tap water from a second sprayer bottle to remove excess solution particles.
   d. Check for developing prints.
   e. Allow the surface to dry (if possible; often not possible in the field in dewy or rainy situations).
   f. Photograph or capture any developed latent prints if practical for the situation.
   g. You can lift developed prints using fingerprint-lifting tape and placing them on a latent print lift card.

5. Safety
   Wear gloves, safety goggles, lab coat (or other protective clothing), and particle mask while preparing the solution and processing with solution.

6. Casework Application
   Any SPR reagent older than six months must be validated prior to casework use by field units. Validate the reagent by placing a test print on a surface similar to the one being processed, applying the reagent, and visually verifying that the reagent is working properly. Note the validation test your notes.

   You can use this technique either in the laboratory or in the field as needed to process non-porous surfaces that are or have been exposed to moisture and are damp or wet. The technique may also work well on galvanized steel and oxidized surfaces.

L. Sudan Black

1. Purpose
   Sudan Black is a dye stain. You can use Sudan Black solution to stain the fatty components of sebaceous sweat. It will also stain surfaces contaminated with grease,

foodstuffs, or dried deposits of soft drinks. You can also use it to enhance superglue-developed evidence prints or on waxy surfaces (candles). The stained print will be a blue-black color.

Sudan Black won't detect uncontaminated fingerprints and isn't effective on dark or printed plastic articles. Therefore, it's essential that evidence be sequentially developed for such residue, if necessary, using other processing methods such as superglue (cyanoacrylate ester) fuming.

This process is for non-porous surfaces. It isn't suitable for porous surfaces, such as untreated wood or papers.

2. Background
   Dye-staining techniques have their beginnings in chemical screening and testing. These techniques were modified to develop or enhance prints recorded with fatty contaminants.

3. Method
   Reagent preparation: See Reagent Preparation section (Section IX)

4. Procedure
   a. Reagent Application
      1) Shake container of working solution and pour into a clean glass dish using a sufficient amount to cover the evidence item.
      2) Immerse the item in the working solution or float it on the surface for approximately two minutes. Use tongs or forceps to handle the item in the solution. NOTE: Remove any metallic-looking film that may appear on the surface of the working solution before using. Do this by drawing a piece of blotting paper or tissue paper across the surface.
      3) Rinse the processed item under cold, slowly running tap water until the excess dye has been removed from the background.
      4) Allow the item to dry at room temperature. Heating is not recommended.
      5) Photograph or capture any developed evidence prints.
      6) You may be able to improve faint prints by re-treatment with Sudan Black.
      7) Rinse used glass dishware with water inside a chemical-resistant sink.
      8) Solution will keep indefinitely. Keep prepared solution in a screw-cap glass bottle. You can pour leftover solution back into storage container.

   Sudan Black will stain surfaces it contacts. You may need supervisor approval prior to processing.

   b. Sequential Procedure
      1) Conduct a visual examination and photograph any visible prints prior to enhancement.
      2) Conduct a fluorescence examination prior to enhancement. (This may improve the print and background.) Photograph if contrast is improved.
      3) Process the item using superglue (cyanoacrylate ester) fuming technique. Photograph any developed prints.
      4) Process the item using Sudan Black solution. Photograph or capture any developed prints.

In some cases, you can improve the photographic contrast by a fluorescence examination. It may be possible to excite the background fluorescence so that the fingerprints appear dark against light background.

5. Safety
   a. You must wear a laboratory coat, chemical-resistant gloves, and safety glasses while mixing and applying the solution.
   b. You should mix and apply the solution in a well-ventilated area.

6. Casework Application
   You will have to determine whether this is an appropriate method to use for the particular surface you're examining.

M. Laser/ALS Examinations

1. Purpose
   This method detects fingerprint and palm print detail, as well as fluorescing trace evidence.

2. Background
   In 1976, it was discovered that laser light could be used to excite inherent luminescence (fluorescence) in finger/palm residue, making the fingerprints visible and amenable to photography. It was later discovered that fingerprint residue on porous (i.e., paper), semi-porous (vinyls, leather, wood), and non-porous (i.e., metals, hard plastics) surfaces could be enhanced with the use of various powders and solutions. Viewing with a laser/ALS can assist in the detection of previously developed prints, as well as make other latent prints visible that weren't visible with room or ambient light.

   The orange filter material used in the viewing goggles and camera filters for laser/ALS photography absorbs the light and permits you to see and photograph the fluorescence. The filter of the viewing goggles also protects your eyes.

3. Procedure
   a. Examine evidence for inherent finger/palm print residue and trace evidence.
   b. Photograph inherent luminescent prints and trace evidence. Collect trace evidence.
   c. CAE fume evidence.
   d. Apply the fluorescing powders or solutions, covering the surface area of your evidence.
   e. Examine with laser/ALS light for light orange, yellow, or green fluorescing print detail on the powder/solution-stained evidence. On porous surfaces, the DFO print will fluoresce yellowish-orange.
   f. Photograph or capture any prints you see after this step.

4. Safety
   a. Wear goggles/filter material to protect your eyes from laser light.
   b. Wear disposable gloves while handling evidence. This will keep the evidence free from any external contaminants on your hands.
   c. The light emitted from the wand on the laser or the ALS is hot. Do *not* allow the tip of the wand to make contact with your skin or the evidence. Also, do *not* leave the tip in close proximity to the evidence (one to two inches) for extended periods of time.

5. Casework Application
   The laser/ALS is the most versatile and powerful tool for developing fingerprints, creating contrast between an evidence print and the substrate surface on which it's deposited.

   You can conduct inherent luminescent examinations on any surface you examine for fingerprints. It's often useful for getting the background to fluoresce in an effort to create contrast with the ridge detail.

N. Laser/ALS Photography

1. Purpose
   This method permanently records fluorescing evidence observed under laser/ALS illumination.

2. Background
   You can document fluorescence photographically with digital photography. Photographic documentation is necessary when you've detected trace evidence or fingerprints due to fluorescence but not under room light conditions.

   The automatic mode on the camera delivers extremely accurate results due to the off-the-film (OTF) light metering system.

3. Method
   a. Photographic documentation materials
      1) Laser or ALS
      2) Canon digital camera with standard zoom or macro lens. You may choose to use other cameras based on your own personal preference or training and experience
      3) Barrier filter. Color of the filter depends on the wavelength of light used and the contrast needed for separation of the fluorescence and the background.
      4) Photographic scale
      5) Tripod or copy stand
      6) Wireless remote shutter release

4. Procedure
   a. Photographic preparation
      1) Place camera on tripod or copy stand.
      2) Set camera on "A" aperture priority. This will allow the camera to choose the correct shutter speed.
      3) Choose f-stop. Best overall f-stop is f/8. Curved or highly textured surfaces require f/16.
      4) Place barrier filter on the lens.
      5) Include the photographic scale.

   b. Examination and photographic documentation of evidence
      1) In a dark room, illuminate evidence with the laser/ALS light. Take care that you don't get the light beam too close to plastic bags, as they could melt.
      2) Position the area of the evidence to be photographed in the center of the focusing screen of the camera.
      3) Focus on the evidence print or trace evidence.
      4) Place the photographic scale next to the evidence (but don't obscure it), making sure that the measurement increments can be seen through the viewfinder.

5) You can take the photograph using the wireless remote shutter release. Using it will prevent camera movement.

Note: You may alter these procedures based on the particular subject you're photographing or your own personal training and experience, as long as the purpose for altering the procedure is to obtain better results.

5. Safety
   a. Wear laser goggles to protect your eyes. Be sure to wear the proper color goggle for the wavelength of light you're using.
   b. Wear disposable gloves when handling evidence, as this protects the evidence from contamination by the examiner and also protects the examiner from contamination by the evidence.

6. Casework Application
   Digitally capture or photograph all fluorescing trace evidence and fingerprints.

O. Blood-Contaminated Print Detail

1. Purpose
   This method detects and enhances blood-contaminated print detail.

2. Background
   Many crimes of violence involve close contact between the victim and the perpetrator. During your investigation of a violent crime, you may observe print detail (friction ridge, footwear, etc.) in blood on a surface. There are many techniques available for the detection and enhancement of blood-contaminated detail. The primary goal in enhancing blood-contaminated detail is to create or increase the contrast between the print and the substrate background.

   There are many factors to consider when you select the type of technique to use:
   a. Surface type
      1) Porous (i.e., paper, cardboard)
      2) Semi-porous (i.e., vinyl, leather)
      3) Non-porous (i.e., glass, ceramic, metals)
   b. Surface color
      1) Dark-colored surfaces
      2) Light-colored surfaces
   c. Time interval between the depositing of the blood print detail and its processing. **BLOOD MUST BE DRIED PRIOR TO PROCESSING.**

3. Method
   a. Coordinate the examination with a detective, if necessary, as reagents used in processing can interfere with subsequent DNA testing. You may contact the OCCL regarding the effects of certain processing techniques. Sometimes you must determine which type of evidence is more important for that particular case, fingerprints or DNA.
   b. You must photograph or capture any visible print detail prior to any enhancement attempts.
   c. Inherent examination using laser/ALS, as blood goes dark and surface/background may fluoresce. Photograph or capture any visible print detail.

d. Reagent Application.

Sequential processing is necessary if you need to develop latent fingerprint detail as well as the blood-contaminated detail. If the blood-contaminated detail is the focus of the processing, you may opt to use a blood reagent only.

The following are the general guidelines used by the OCCL when blood-contaminated prints are or may be on surfaces where latent prints are also being sought. The processes that you can complete using the chemicals available in the BPPD FSU lab are highlighted in red.

1) Porous, dark-colored surface; dark-colored fabric
   a) DFO (laser/ALS examination)
   b) Merbromin (laser/ALS examination)
2) Porous, light-colored surface
   a) DFO (laser/ALS examination)
   b) Ninhydrin
   c) DFO (not a (laser/ALS examination)
   d) Physical developer
3) Semi-porous / Non-porous, dark-colored surface
   a) Cyanoacrylate Ester (CAE) fume
   b) RAM (LASER/ALS examination)
   c) Merbromin (LASER/ALS examination)
4) Semi-porous / Non-porous, light-colored surface
   a) Ninhydrin, if the surface is semi-porous (i.e., some woods, Styrofoam); if not, go to step b
   b) Leucocrystal Violet
   c) Amido Black
5) Skin of a deceased person: Amido Black (will be completed by OCCL)
6) Fabric, light-colored: DAB

If you must complete processing in the field, you must decide if processing by BPPD FSU will suffice, or if it's necessary to call OCCL. BPPD FSU may complete laboratory processing and send the evidence items to OCCL for further chemical processing.

4. Procedure
   Refer to each of the reagent sections for the application guidelines for that reagent solution. You may vary the sequence of application based on the particular circumstance involved and your training and experience.

5. Safety
   a. You must take proper precautions when handling blood-contaminated items.
   b. You must wear gloves while examining the evidence to help protect you from bio-hazardous exposure.
   c. Wear a lab coat while examining the evidence to protect your clothing and skin.
   d. Wear eye protection to act as a barrier and to protect your eyes from reagent splashing and contamination from the blood.
   e. Conduct examinations in a fume hood to protect you from chemicals/reagents and bio-hazardous fluids.
   f. Wear the proper type of goggle for the LASER/ALS unit you are using.

g. Dispose of the gloves you wear while handling the blood-contaminated items in the proper bio-hazardous waste container.

P. Aqueous Amido Black

1. Purpose
   Amido black dye is a general protein stain. You use amido black solution to create contrast with the background by staining the proteins present in bloody evidence prints (fingerprints / shoeprints / tire tracks). Amido black will also stain any other protein present in the background, such as other body fluids containing proteins or some food residues.

   Amido black won't detect the normal constituents of waters and oils in latent print residue. Therefore, it's essential to sequentially process for such residue, if necessary, using other processing techniques (unless specifically processing ONLY for prints in blood).

2. Background
   Dye-staining techniques have their beginning in serological screening, which tests for the presence of blood. These techniques were modified to develop or enhance prints in blood or protein residue.

3. Method
   Aqueous amido black is a water-based solution that includes a blood fixer. It's a one-step process; the fixer solution is in this formula, therefore eliminating the need for a separate fix solution. The process uses deionized water for the rinse.

   Reagent Preparation: Solution is pre-formulated.

4. Procedure
   a. Apply the amido black solution to the evidence by dipping, squirt bottle, or pipette.
   b. Cover the area for at least 30 seconds. If the background is porous and the background will stain, apply the solution for less time.
   c. Rinse the evidence with deionized water.

   Treat used amido black solution as and discard it in the same way as blood evidence.

5. Safety
   a. Wear chemical gloves, protective clothing (lab coats), and protective eyewear when using aqueous amido black.
   b. Use amido black in a fume hood when possible, or with an organic/acid respirator (Airway Purification Respirator) at the crime scene. Some of the solvents in this formula are hazardous and corrosive.
   c. Take proper safety precautions since the surfaces being processed are contaminated with blood and are a biohazard.

6. Casework Application
   Appropriate for cases that may have blood-contaminated evidence prints.

   You may need to make a case-by-case determination regarding DNA vs. processing for fingerprints with amido black. Although you can still extract DNA from an evidence print processed with amido black, try to take a DNA sample prior to amido black processing

when practical). The amido black process may interfere with questioned document and trace evidence examinations.

Store the amido black solution in clear or dark bottles. The shelf life is indefinite.

Q. Leucocrystal Violet (LCV)

1. Purpose
   This method detects blood-contaminated print detail and increases contrast between the print and the substrate background on which it's deposited.

2. Background
   Leucocrystal violet (LCV) is a catalytic test for blood. LCV is the reduced or colorless form of crystal violet. When LCV and hydrogen peroxide come into contact with hemoglobin or its derivatives, a violet-colored dye (crystal violet) is formed. This occurs through the catalyzed oxidation by peroxide.

   Since LCV has an affinity for proteinaceous substrates, it will bind to the protein that has been fixed by the 5-sulfosalicylic acid contained in the solution. This limits leaching or running of the dye impression.

3. Method
   Reagent preparation: See Reagent Preparation section. (Section IX)
   Reagent application: IF BLOOD IS WET, IT MUST BE AIR-DRIED PRIOR TO APPLICATION OF THE REAGENT.

4. Procedure
   a. Perform a validation test on the reagent prior to any field or laboratory application (see Reagent Manual).
   b. Pour LCV in either a spray bottle or a wash bottle.
   c. Spray or cascade the LCV on the evidence item.
   d. You may rinse the impression with water approximately thirty seconds after you apply the LCV.
   e. The oxidation reaction will continue, producing a dark blue/violet impression. Should the enhancement occur outdoors (in intense light), you must photograph or capture the impression as soon as possible since photoionization of the dye may occur, creating a violet background.
   f. Photograph or capture any impression detail observed.
   g. You can apply amido black after LCV.

5. Safety
   a. Mix and apply the reagent in a fume hood if you're in the in the laboratory, or in a well-ventilated area if you're in the field.
   b. You must wear laboratory coats and gloves while mixing and applying LCV solution to protect yourself from the solution and the blood on the item.
   c. When applying the reagent in the field, wear protective clothing consisting of a Saranex suit (bunny suit) or a jumpsuit to protect yourself from getting the reagent on your skin.
   d. You must wear eye protection, as there's a risk of splashing or misting the solution into your eyes.
   e. You must wear an Air Purifying Respirator (APR) with APR combination cartridges (P-100 HEPA filter), either a full-face piece dual cartridge or a half-mask dual cartridge

unit (used in conjunction with goggles), in the field to protect your respiratory system from the solution and the blood on the item.

6. Casework Application
   You can use this technique at your discretion. This technique is appropriate for cases that have blood-contaminated detail. As in all cases that have blood-contaminated items, you should perform serological testing prior to LCV application. You can use LCV in either the laboratory or the field.

XI. LATENT COMPARISONS

A. Purpose

This section outlines the process you'll use to conduct an examination, comparison, and documentation of unknown latent(s) to potential candidate(s) known inked prints.

B. Method

Forensic specialists develop their expertise to the point of familiarity after receiving a sufficient quantity of hours in both formal education and in-house peer training. Other expert(s) with more experience and who are off probationary and trainee status provide training and oversight. After the Forensic Supervisor authorizes them to conduct latent print examinations and comparisons in-house, the forensic specialists will follow the current practice outlined in this section.

C. Practice

1. Automated Fingerprint Identification Systems

   The BPPD Forensics Unit uses Automated Fingerprint Identification System (AFIS) to search up to ten prints and quality latent prints through the Automated Biometric Identification system (ABI) and state (DOJ) databases. You can also use the FBI Integrated Automated Fingerprint Identification System (IAFIS) to search latent prints.

   You can search ten prints and palm prints through the Orange County database using Cal-ID, DOJ, and FBI. Search quality latent prints first through the Orange County database, then through the state database via DOJ.

   Register latent prints not matched through county and state databases to the unsolved database. Check candidate reports received on previously registered prints from Orange County Cal-Id in a timely manner. Note the date of the crime and the statute of limitation.

   To save time, obtain elimination prints from victims and witnesses when possible.

2. Comparison and Documentation
   a. Inked print to inked print
      Follow the ACE-V methodology when you compare inked-to-inked fingerprints, with the exception of verification. When you make an identification while comparing inked-to-inked fingerprints, you don't need the verification process since you're comparing known prints to known prints.

b. Latent print to inked print
Follow the ACE-V methodology when you compare latent prints to inked prints. At least one other examiner shall independently verify all results and conclusions. Document the examination results and/or conclusions using the terminology set forth (i.e., identification, exclusion, inconclusive). However, you can still use the terms “make” (identification) as conclusion for a positive match, and “no make” as conclusion for inconclusive or non-identification. The supplemental report and/or latent report should reference the application of the ACE-V methodology when documenting fingerprint examinations and conclusions.

c. Conflict resolution
If two forensic specialists have differing opinions regarding an identification of a latent print, a third forensic specialist and/or an independent outside agency (i.e., local police department, OCCL) should perform the examination, comparison, and verification of the same latent print. The handling forensic specialist should document the verification process in his/her report. (For example; “On March 3, 2012 latent #1A was given to FS Smith for verification, which resulted in conflicting conclusions. FS Smith deemed the comparison inconclusive. On March 4, 2012 FS Black verified the identification of latent #1A to Brian Clarkson. There were no additional conflicts of opinion.”)

In all cases, you shall document comparisons, conclusions, and verifications, including name of verifier, in an official report. Store the latent report, supporting materials, and the evidence (i.e., latent prints) in a properly labeled latent envelope (containing case number, handling forensic specialist, date, etc.). Store the envelope in a locked cabinet inside the Forensic Services Unit’s secured office. If for any reason the latent envelope is to leave the secured forensic unit (i.e., court, outside latent expert), the envelope shall be sealed, initialed and dated.

3. Comparison in Court
In some cases, the District Attorney (DA) may request a fingerprint comparison be done to prove to the court that the inked fingerprints obtained from the defendant present in court are a match to the inked fingerprints used during the initial comparison and identification process.

OCCL has trained court deputies and DA investigators to collect fingerprint and palm exemplars for these purposes. If asked, you will have the requestor contact the court deputy or DA investigator to roll the prints for comparison and deliver them to BPPD for ink-to-ink comparison. You don’t need verification when performing this type of comparison.

BPPD forensic specialists will not respond to court to roll prints or conduct latent comparisons for the following reasons:

a. The courtroom is not a controlled environment regarding lighting, noise, and distractions.
b. An inked-to-latent comparison requires a verification to be completed by another individual.
c. A different examiner may reach a different conclusion.
d. The newly rolled exemplar may not have the anatomical area needed to compare to the latent resulting in an inconclusive decision.

e. Some cases may have a large number of latents, and to perform a re-comparison of each one would be extremely time-consuming.

You might be asked to bring latent evidence with you to court, usually during the preliminary process. The defense may request this so that the attorney can inspect the latent evidence (packaging, documentation on latent card, etc.). **You will not release the latent evidence into the custody of the defense.** The quality, proper handling, and the integrity of the evidence are crucial. Treat latent evidence like any other evidence. Just as the department wouldn't release any other physical evidence (i.e., firearms, documents, etc.) directly to the defense in court, the latent evidence should follow the same protocol. If the defense wants to examine the latent prints, follow the protocol under the 'Outside Agency' section.

4. Outside Agency
   In some cases, the defense may demand to have their own fingerprint expert conduct a latent print examination. The defense's expert may contact and make an appointment with the Forensic Supervisor and/or Forensic Services Unit personnel.
   a. The expert shall perform the examination on BPPD premises.
   b. The outside fingerprint expert may photograph the fingerprint evidence.
   c. You should make sure to open the sealed latent envelope in the presence of the outside fingerprint expert.
   d. A BPPD forensic specialist should be present to insure proper handling of the fingerprint evidence during the examination.
   e. You should make sure the fingerprint evidence wasn't damaged or compromised during the examination process prior to resealing the latent envelope.
   f. Make a note on the latent envelope that the defense's fingerprint expert performed an examination.
   g. The defense fingerprint expert should also initial and date the envelope at the time it's resealed.

XII. ALTERNATE LIGHT SOURCE

Alternative light sources (ALS) are filter-based systems considered an alternative to lasers. An ALS uses an intense white light that is then filtered to the desired color or wavelength. The filters used allow only a specific color of light through. These unique wavelengths were designed to match those needed for laboratory or crime scene processing of evidence.

A. Wavelengths

1. 530nm: use with orange goggles or filters. This wavelength is perfect for locating and viewing all types of evidence since it has the highest output power. Due to the broad bandwidth, use other settings if background fluorescence occurs.

2. 485nm: use with orange goggles or filters. It provides great contrast and is most commonly used on surfaces treated with chemical dyes. It's also useful for detecting trace evidence, such as fibers and paint flecks.

3. 525nm: use with orange goggles or filters. It's useful for trace evidence and fingerprints processed with fluorescent powders and dyes.

4. 450nm: use with yellow goggles or filters. This is generally the optimum setting for detecting physiological stains such as semen, saliva, urine, and blood. It's also useful for bite mark and bruising detection.

5. 570nm: recommended for use with red goggles or filters. This setting will give optimum results on chemically treated porous items that exhibit strong background fluorescence.

An ALS can be hazardous when used improperly. It's essential that you wear proper eye protection, otherwise you may suffer permanent eye damage. Exposing your skin to the beam of light (directly from the unit) can cause burns and other skin damage.

You must wear goggles when operating the ALS. Goggles protect your eyes and allow you to visualize the fluorescence. Use yellow, orange, or red goggles (depending on the wavelength) with the ALS. You must use a colored filter when photographing with the ALS. Each goggle or camera filter color is designed for cutoff at a particular wavelength.

There are two types of fluorescent powders used in the processing for print detail, *magnetic* and *non-magnetic*. The non-magnetic powder comes in Greenwop and Redwop; the magnetic powder comes in red blitz and green blitz. Each of the non-magnetic powders has a dedicated feather fingerprint brush. Use each brush specifically for one type of powder. If you mix brushes in different color fluorescing powders, contamination of the powders could inhibit fluorescence. The non-magnetic powders are very fine-grained; a small amount of these powders will go a long way.

If you're at a crime scene and believe the processed print detail won't tape lift, take photographs of the print detail. Refer to the photography portion of this manual to photograph items using the ALS. Place the lifted fingerprint detail on a black lift card.

B. ALS Applications

1. Fingerprint Detection
   a) Inherent luminescence: prints that fluoresce naturally
   b) Enhancement with fluorescent powder

2. Physiological Fluids
   a) Semen: fluoresces
   b) Vaginal secretions: fluoresces
   c) Blood: absorbs light and does not fluoresce
   d) Urine: weaker fluorescence than semen
   e) Saliva: weaker fluorescence than semen

3. Contaminants
   a) Gasoline, motor oil
   b) Lipstick, cosmetics, nail polish
   c) Paint
   d) Animal fats
   e) Organic proteins

4. Hairs and Fibers
   a) Fibers will absorb or fluoresce for increased contrast
   b) Hairs will usually not fluoresce

5. Source for Oblique Lighting
   a) Dust prints
   b) Black-powdered prints
   c) Shoeprints and latent shoe prints
   d) Striation marks
   e) Enhancement of any dimensional contrast
   f) Bruising and bite mark detection

XIII. IMPRESSION EVIDENCE

Impression evidence can be generally defined as objects or materials that have retained the characteristics of other objects or materials through direct physical contact. It's any three-dimensional impression left by an object.

A. Footwear Evidence

Shoes are made in a variety of ways and in thousands of designs. In turn, each design is made in many distinguishable sizes. As the outsole wears, its design and other characteristics steadily change. They acquire random cuts, scratches, nicks and other characteristics. These traits give them a tremendous degree of individuality.

Proper crime scene investigation techniques include a cautious approach to searching for footwear evidence. You must think about how a suspect may have entered and exited the scene. Always keep in mind the numerous surfaces the suspect may have walked on. The following are some areas to search for footwear evidence.

1. Impression in soil or dirt (may be present with visible light or may have to be enhanced using oblique lighting techniques)
2. Impressions from water or rain (these would need to be photographed quickly before evaporation begins)
3. Impressions on freshly waxed floors or furniture
4. Impressions on certain types of vegetation, such as wide leaves
5. Tiled, carpeted, wood, or linoleum floors
6. Impression in blood or other materials
7. Counter areas under windows where entry may have been gained
8. Miscellaneous items laying on the floor or counter tops- papers, cardboard, etc.

B. Documentation

You must properly document footwear at a crime scene.

1. Photographs
   a. Take an overall photo to show the placement of the shoeprint in the scene. This overall photo must include a scale and a north arrow.
   b. Take a close-up photo. Place a scale, photo tag (with CR#, date, and initials), and north arrow in all close-up photos.
   c. You can use f11 in most instances. On a sunny day, you'll need to shade the impression.

d. Shoot at least four flash directions for each impression. The angle of the flash will depend on the depth of the impression. Use a flashlight to determine the correct angle for the flash.

2. Sketch
   If requested by the handling detective, or in the case of a serious violent crime, always draw a sketch of each shoeprint, showing the pattern, size of the impression, and a north arrow.

3. Gel-lifts
   You may use a gel lift to lift dust prints on non-porous surfaces. Never use a gel lift on a hot surface, like a hot car: they will melt. Always photograph the gel lift before packaging.

C. Casts

You should cast all three-dimensional footwear impressions. Casts are beneficial for several reasons. They provide a lifelike molding of the original impression. Casts can reproduce microscopic characteristics, and in deep impressions, they can reproduce characteristics on the side of the outsole and midsole of the footwear. Casts can also back up the photographs with a tangible three-dimensional piece of physical evidence.

After you've taken photos, you can start casting an impression.

1. On softer impressions, you can harden the impression by spraying dirt hardener gently and evenly over the impression.
2. The forensic vehicle carries dental stone and water.
3. Depending on the size of the impression you're trying to cast, select an appropriate size black rubber bowl for mixing.
4. Mix the dental stone material and water thoroughly until you achieve a thin pancake-like consistency.
5. If there's standing water in the impression itself, or if the impression is in very wet mud, you can sprinkle a small amount of the dry dental stone into the impression prior to pouring the mixed casting material into the impression.
6. Pour the mixture into the impression. Start just outside the impression and allow the mixture to push itself into the impression from one end to the other. Use the spatula to deflect the stream of material. Don't pour back and forth over the impression or around the edges, then fill in the center.
7. If the top of the mixture is lumpy or uneven once you've poured the mixture into the impression, lightly jiggle the top of the mixture with your index finger to smooth out or relax the material. This will also aid in removing air bubbles from the material.
8. After you allow the cast to dry for about ten to fifteen minutes, write the case number, the date, initials, impression number, and a north arrow on the back of the cast using a permanent marker.
9. In most conditions, the cast will be ready to lift from the ground in less than thirty minutes. When the cast is dry, gently lift it from the ground and package it with the dirt still attached. Do *not* clean the cast in the field. The casting material doesn't completely dry for 24 to 48 hours and cleaning the dirt from the cast before this can do damage to the cast. The cast will be cleaned only if a comparison is conducted.
10. Package the cast in a gun box and write "fragile" on the outside of the box. Secure the cast with cable ties to prevent movement.

D. Tire Tracks

The tire manufacturing process is a very complicated one. Oils, chemicals, natural and synthetic rubbers, fabrics, and wire are the basic raw materials used. As tires are used and become worn, changes occur that give these tracks their individuality.

As with footwear impressions, documenting tire track impressions correctly is of the utmost importance. We use photographs, sketches, and casts to document tire track impressions.

1. Photographs
   Take overall photos of the tire tracks to show their relation to the scene, and possibly the direction of travel.
   a. You must use a tripod.
   b. Lay a metal tape measure along the side of the tire impression. You must photograph a minimum of six feet.
   c. Start taking photos at “0” on the tape measure. Each frame should cover no more than 20-24 inches. Be sure to overlap the photographs using the tape measure as a guide.
   d. F/8 works well in most cases. On sunny days, you may need to shade the target area so you can photograph it.
   e. Shoot at least four different flash directions for every section and exposure. The angle of the flash depends on the depth of the impression. Use a flashlight to find the correct angle for each impression.
   f. Each frame must include the metal tape measure, a photo tag (with CR#, date and initials), the evidence marker for that impression, and a north arrow.

2. Sketch
   Sketches document the location of the impressions within the scene.
   a. Indicate the direction of travel, measurements, and a diagram of the tread pattern.
   b. Take measurements of the width and length of each individual impression.
   c. Take the track width measurements if the tracks from both sides of the vehicle are present at the scene. The track width is the distance between the centers of each tire.
   d. Note the wheelbase measurement if you can determine it. The wheelbase measurement is the distance between the front and rear axles.

3. Casts
   Follow the same directions for casting footwear impressions. However, a tire track cast will require more dental stone. You must cast a minimum of three feet. Mix the dental stone all at once in a bucket.

   a. Casting Rubber Transfer Tire Impressions
      When a rubber transfer of a tire impression (skid or acceleration marks) is discovered on cement or smooth asphalt, you may need to cast the impression. Taking examination-quality photographs of a rubber transfer impression can be difficult in some cases. Therefore, casting the impression may be the only record of the impression detail.

      Dental stone casting provides a means of obtaining rubber transfers of tire impressions from surfaces that aren’t extremely smooth, such as semi-smooth cement and asphalt surfaces. The rubber residue itself is collected when you lift the impression with dental

stone. This provides a much clearer representation of the impression and is why its useful application extends to smooth and semi-smooth cement and asphalt surfaces.

You must evaluate two issues about the rubber transfer impression before deciding which documentation method (photography only, Kinderprint Handy Lift, or dental stone casting) you will use.

1) Do the examination-quality photographs of the impression clearly depict the detail you see in the transfer on the surface?

   You can use the digital camera's LCD screen to view photographs and determine if the tread pattern and contrast are accurately represented in the image. If you determine the impression's tread pattern, is clearly depicted in the image with sufficient contrast, then it's not necessary to cast the impression.

2) Is the surface conducive for casting?

   The surface must be smooth enough that you can remove the dental stone cast with the impression intact. Smooth concrete and fairly smooth asphalt surfaces are ideal for the dental stone casting method. If the surface is too textured or gravelly, the dental stone will seep its way into the crevices and, when dried, will not release from the surface.

   When you're in doubt about either of these questions, you're expected to attempt to cast the impression. Keep in mind that dental stone casts may break apart when removing them from flat, rigid surfaces. Also, the rubber transfer impression may not always lift from the surface onto the dental stone.

b. Casting Steps
   1) Blow away loose dirt and gravel from the casting area. The rubber transfers on these surfaces are generally quite stable, and loose debris on the cast will detract from the impression.
   2) Place a latent card or packaging tape next to the impression before pouring the casting material. When you make the pour, part of it will be on the latent card or tape. This will help when you lift the impression from the surface.
   3) Making a thicker batch of dental stone will allow you to make a thicker cast and will limit breaking.
   4) Drying times will vary with temperature. Colder ambient temperatures will require longer drying times, and warmer temperatures will shorten them. In general, you can remove casts from concrete and asphalt surfaces after 30-40 minutes without breakage. The longer you let the cast to set, the harder the dental stone will become, and the less likely the cast will break when lifting. Should a cast break in pieces when lifting, you can glue the cast back together if a comparison is conducted with it at a later date.
   5) The casts will generally release fairly easily from the target surface. Occasionally, you will have to tap on the edge of the cast or gently pry the cast from the surface using a screwdriver or other prying tool.
   6) The rubber transfer material lifted onto the dental stone cast is very stable and doesn't rub or fall off the surface easily.
   7) When packaging the cast, use a protective wrap such as paper, paper towels, paper bag, or bubble wrap to protect the cast from breakage.

E. Tool Marks

Tool marks can be left in wood, metal, putty, or paint. Some tool marks can exhibit only class characteristics, such as size or shape. Other marks can show striations, indentations, or irregularities that can help in individualizing the tool used.

You must include the location and size of the tool mark in your case notes, along with any other description of the impression.

The best method for preserving tool marks is to collect the item on which the mark was made. Once collected, you must protect this tool mark from further scratches or contamination by other items of evidence.

You must photograph tool marks prior to collection. Take orientation photographs showing the location of the tool mark, then close-up photos. You must take close-ups parallel to the tool mark and include a scale in the photograph.

Another method of preserving tool marks is through casting. Mikrosil is the most common casting material used. A Mikrosil kit contains the following: a large tube of brown putty, a small tube containing the blue hardening agent, a mixing pad, and a wooden spatula. To make a Mikrosil cast:

1. Squeeze an equal length from each tube onto the mixing pad and stir them together with the wooden spatula.
2. When both components are thoroughly mixed, use the wooden spatula to cover the area to be cast with the Mikrosil.
3. Allow the cast to dry for five to ten minutes.
4. Once the Mikrosil is dry, you can place the cast between two lift cards and package it in a manila envelope.
5. You must draw a sketch on one of the cards to show the location of the mark. Draw an arrow indicating the “up” position.
6. You must protect casts from damage or contamination during transportation.

Be mindful of other trace evidence that may be present around tool marks. For example, if an indentation is made in wood or paint, those items may be transferred to the tool used. You should also collect standards of wood and paint.

XIV. REPORT WRITING

Proper documentation of work performed at crime scenes is essential for the successful apprehension and prosecution of suspects and your own future recollection of events. Notes alone can’t suffice as the official record. Courtroom testimony frequently requires you to refer to your report.

Crime scene reports are considered to be technical reports and therefore will be written in the first person, past tense. This means you use the word “I” to describe yourself and use the verbs “was” and “were.” The words “are” and “is” are present-tense verbs and, therefore, are inappropriate for crime scene reports.

Write reports in a clear, concise manner that’s easy to read and understand. Follow a logical order to avoid repeating the same information in the report. Crime scene reports should directly reflect

the information contained in your notes from the crime scene. Take great care to make sure that your report accurately represents the information contained in your notes. The facts or evidence represented in the notes must support any conclusions stated in the report. Keep reports free of unidentified hearsay and conclusions unsupported by documentation.

Finish all reports for routine field calls as soon as possible after the initial call. Proofread all reports prior to submission for approval. While you're in training, your trainer will initial your reports.

A. Report Forms

Complete the Forensic Unit Supplemental Report for all examinations and field processing you perform. The report is included in the original case file in the RMS. The following is a description of what information you need to include in your report.

1. Location of investigation/date/time. Include the address or intersection of the location responded to, as well as the date and time of response.

2. Describe the call type (i.e., vehicle burglary, murder investigation, etc.).

3. Include the victim's name, if known.

4. Location of crime. Include only if different from location of investigation.

5. Vehicle Information. Include if a vehicle is a part of the investigation (i.e., stolen vehicle). List the license plates or Vehicle Identification Numbers (VIN) of all vehicles examined. The last four digits of the total VIN are all that is necessary.

6. Describe the type of processing performed (i.e., fingerprinting, swabbing). Document the type of powder/chemical you used for fingerprint processing and findings. (For further details on documenting fingerprint processing and recovery, refer to Section X. Latent Processing of this manual).

7. Include or list evidence collected, and location evidence was collected from.

8. Document any and all additional processing performed at the BPPD Forensic Lab.

9. Indicate that evidence was booked into BPPD property.

10. Indicate whether a crime scene diagram was prepared.

11. Indicate the number of photographs taken. All photographs should be uploaded into Evidence.com and noted in the report.

B. Forensic Unit Work Request and Assignments Form

Officers complete this form when they need follow-up on a call. This can include a response to a location by a forensic specialist when the crime occurred during off-duty hours, or a request to process evidence previously collected. The forensic specialist assigned completes the section at the bottom.

You will complete a Forensic Unit Supplemental Report for all examinations or processing you perform. The exception is when you don't perform any examination or processing due to case circumstances (for example, the victim declined the processing of a stolen recovered vehicle). You should note the fact and the reason for the lack of examination or processing on the Forensic Unit Request form. Scan all Forensic Unit Request forms into the RMS under the "Files" section.

For further details, refer to BPPD Policy 344, Report Preparation.

XV. RECOVERED STOLEN VEHICLES

A. Orange County Protocol

In May 1999, the Orange County Chiefs of Police and Sheriff's Association adopted a procedural protocol for the collection and processing of fingerprint evidence on recovered stolen vehicles within Orange County. While the operating protocol and procedures are generally recommended for use by all Orange County law enforcement agencies, each individual agency retains the discretion to adopt, reject, or modify any portion of the guidelines in accordance with existing rules and regulations of that agency. BPPD has chosen to adopt these guidelines as its own, with limited modifications.

Every effort must be made to investigate and prosecute persons who steal vehicles, regardless of the motives or intents to deprive the legitimate owners of their use. As a result of this, BPPD FSU will make every effort to perform a latent print search on recovered stolen vehicles when one of the following occurs.

1. The vehicle was stolen and recovered in Orange County.
2. There are other felony crimes associated with the recovered stolen vehicle.
3. In the best judgment of the officer or supervisors at the scene of a recovered stolen vehicle, such a search would be productive.
4. The vehicle was used during the commission of a crime in the city of Buena Park.

Notwithstanding other agreements, BPPD will retain and process latent prints recovered. In the event a positive identification is made, the case agent and/or the District Attorney's Office will determine the prosecution of the case.

B. Buena Park Police Department Procedures

The field officer recovering the vehicle shall have the vehicle towed to Brookhurst Tow. The officer shall write "Hold for Prints" across the top of the CHP 180 form provided to the tow yard so they will store the vehicle in a locked facility separate from the general vehicle lot.

Vehicle traffic and lighting conditions may hamper processing at the scene. The tow yard provides a secure location with adequate lighting for you to conduct a thorough investigation. This also frees up the officer to go back into service.

If the vehicle is going to be released to the owner at the scene, a forensic specialist shall respond for processing, if available.

When recovered stolen vehicles are towed from the field, the recovering officer shall fill out a FSU request form to have the vehicle processed at the tow yard. On the request, the officer shall include the following:

1. The location to which the vehicle was towed

2. The date the vehicle was stolen, if known
3. A copy of the CHP 180, or identifying vehicle information, which should include at least the license plate number or VIN of the vehicle to be processed
4. Any pertinent information regarding the vehicle or contents, e.g., how many suspects, which property belongs to the victim, what property may be that of the suspect, etc.

C. Out-of-County

1. Recovered
   When out-of-county stolen vehicles are recovered, the Records Bureau shall notify the originating agency. The agency will advise whether their forensic unit will respond for processing. If they don't wish to respond, the vehicle may be released to the owner.

2. Stolen
   If a vehicle was stolen outside of Orange County but is related or possibly related to another crime occurring in the City of Buena Park, the recovering officer can request a BPPD forensic specialist to process the vehicle. On the request, the officer shall include related crime info and case numbers, if applicable, so the forensic specialist knows the reason for the request.

   After you process the vehicle, you will update the vehicle status in the RMS. In the narrative section, you shall state that the vehicle was processed, the date it was processed on, as well as your initials (example: "11/27/2005 - vehicle processed – SP"). This advises the Records Division and front counter personnel that FSU has cleared the vehicle to be released.

XVI. DNA and CODIS GUIDELINES

The OCCL uses one universal evidence request form for work to be performed by the ID Bureau, Toxicology, and Criminalistics. This form is available on the Orange County Sheriff's Department website.

The use of DNA evidence is often critical to the successful identification of suspects and the elimination of innocent individuals. First responders and forensic specialists must be aware of the potential presence of DNA evidence at a crime scene and protect and preserve the evidence until it can be collected. Only individuals trained in the proper techniques of processing, storage, and transportation of DNA evidence should complete the collection of the evidence.

A. Electronic Work requests

Electronic work requests submitted to the crime lab for DNA analysis should include the following information and be processed according to these guidelines.

1. Basic case information, such as agency CR number, victim and suspect names, crime charge, date of incident, a brief case scenario, including the type of biological evidence collected and a specific description of where the evidence was located, and how the evidence relates to the suspect(s).

2. Swabs collected from evidence items by the agency will receive priority over evidence items that are submitted to the laboratory and require processing. Agencies that are able to process items for latent fingerprints should do so before submitting the item to the lab.

3. Do *not* list evidence on the work request as simply “swabs” or “swabs of biological material”. You must provide complete evidence descriptions, including information about the swabbed item and its location.

4. The DNA profile(s) obtained from evidence samples for CODIS entry (DNA database) MUST be suspect-related and from crime scenes. However, you can’t enter into CODIS evidence collected directly from a known suspect, other than a buccal swab or blood standard. Examples of samples that can’t be entered into CODIS are fingernail scrapings, penile swabs, or clothing collected directly from the suspect or his/her environment.

5. It is highly recommended that victim, witness, and consensual sex partner (for sex-related crimes only) elimination standards be collected in major crime cases prior to submitting a case to the laboratory for analysis. You must submit victim elimination standards to the lab for property crime cases involving handled- and touched-item DNA. The analysis of elimination standards will prevent non-suspect related DNA profiles from being entered into CODIS. CODIS has strict requirements for database entry. If you can’t obtain victim or elimination standards, clearly note the reason on the work request.

6. Each evidence swab must be dried and individually packaged in its own coin envelope. You must seal the coin envelopes and clearly mark them with a description of the swab inside. You can then package all the sealed coin envelopes in one 6X9 manila envelope.

7. Touched and handled evidence swabs submitted for DNA analysis should have been collected from areas known or strongly expected to have been touched by the suspect(s). Don’t submit evidence swabs from frequently touched surfaces in public places, such as exterior doorknobs, counters in stores, and cash drawers handled by numerous cashiers.

8. You must submit victim elimination standards when requesting DNA analysis of evidence swabs from touched and handled items unless it’s documented that the item was left behind by the suspect and was not touched by the victim(s).

9. Don’t place victim or suspect standards in the same package as evidence swabs. Clearly mark the outside of the package with the name of the individual sampled. Indicate the nature of the connection of the individual to the incident (suspect, victim, witness, boyfriend, etc.).

10. If detectives would like a suspect standard entered and uploaded into CODIS, then they must sign the attestation on the work request.

B. Priority of Casework in the DNA Lab

Priority of DNA casework is based upon an evaluation of the request, the type of crime, and the nature of the need. The following list is an example of the types of priorities of cases for DNA analysis. Agencies are requested to call a DNA supervisor to move a case to a higher priority based on court schedules, serial crimes, or special circumstances.

1. Examples of High-Priority Cases
   a. Violent crimes with statute of limitations, suspect is in-custody with a scheduled court date, or suspect is a flight risk
   b. Homicides

c. Cases with court dates occurring in six weeks or less
d. Violent crimes such as sexual assaults, robberies, arsons, and assaults

2. Examples of Lower Priority Cases
   a. High volume / property crimes such burglaries and recovered stolen vehicles
   b. Cases containing blood, cigarette butts, bottles, cans, straws, worn items left behind by suspect, and cases involving stolen firearms
   c. Handled/touched-item cases with victim elimination standards
   d. Gun possession, drug and drug paraphernalia possession, handled/touched-items cases with no elimination standards available, and vandalism (analysis will be on a case-by-case basis)

C. Violent Crime Cases

1. Work Request and Evidence Submission Guidelines
   All violent crime cases require consultation with a DNA supervisor to determine which evidence items may be probative and submitted for DNA analysis. The number of evidence items that may be submitted will also be determined and agreed upon during the consultation.

   You may contact the OCSD-FSS DNA Section Supervisors and DNA Director at 714-834-6336 or 714-834-6331.

D. High-Volume Crime Cases

1. Work Request and Evidence Submission Guidelines
   a. Prioritize the three samples that would provide the best forensic opportunity for obtaining a suspect DNA profile on the work request.
   b. Submit the appropriate victim elimination standards.
   c. If elimination standards aren't available, then include wording indicating that the sample is from the suspect and not from the victim on the work request.

E. Other Charges

1. Residential 459PC (burglary). A maximum of three samples plus victim elimination standard(s) will be accepted. You may submit suspect standards for comparison as available. Swab samples from 488 PC or 487 PC are allowed if probative evidence is present or the evidence is related to a series of crimes with similar motive.

2. 10851 PC (recovered stolen vehicle). A maximum of two samples plus victim elimination standard(s) will be accepted. One of the two samples should be a swab from the vehicle interior, such as a steering wheel or gearshift swab that will relate the suspect to the stolen vehicle. You may also submit probative evidence under certain circumstances.

3. Attempted 10851 PC cases, and cases where the contents of the vehicle were attempted to be stolen, will not be analyzed unless there are exceptional circumstances.

4. 20001/20002 VC (vehicle accident with injuries). A maximum of three samples plus victim elimination standard(s) will be accepted.

5. Casework for the following charges will generally not be accepted for DNA analysis. However, these types of cases can be reviewed based on the case information provided and accepted if extenuating circumstances dictate that they are of a highly probative value, part of a series, or connected to an extremely important circumstance.
    a. 594 PC (vandalism)
    b. 11350/11377 PC (drug and drug paraphernalia possession)
    c. Found firearm (unless connected to a crime)
    d. 12021/12031 PC (gun possession)
    e. 243.4 PC (sexual battery)

The above are guidelines only. If you have special case circumstances or questions regarding the Orange County Crime Laboratory's DNA evidence submission policy, please contact one of the DNA supervisors listed above.

XVII. DIGITAL EVIDENCE

Refer to BPPD Policy 814, Computers and Digital Evidence.

XVIII. COURT APPEARANCES

Refer to BPPD Policy 348, Court Appearance and Subpoenas

XIX. CALL-BACK PAY AND COURT PAY

Refer to the Police Association MOU, Article 14-Overtime Pay.

Appendix A

BIOHAZARD LOCKER/DRYER PROCEDURE

1. **Enter your items into Spillman to obtain evidence item numbers.**

2. **Select a locker/dryer to place items in.**
   - You can place multiple items in one locker, but be sure to put items from different individuals in separate lockers. If you collect items from two individuals, you should use 2 lockers; 3 individuals use 3 lockers.
   - Items from multiple case numbers should be separated and placed in different lockers.

3. **Hang and/or place items inside locker(s).**

4. **Close exterior door, make sure padlock is in "locked" position, and remove the key.**

5. **Flip the switch at the bottom front of the unit to turn fan ON.**

6. **Fill out a CSI request form and be sure to include the incident number, evidence item number (Spillman), and the locker number you secured the items in. *Be sure to indicate what item corresponds to each item number.***
   - You DO need to enter the items of evidence into Spillman, just as you do when you submit evidence/property for general booking. CSI will only be REPACKAGING these items and re-booking them into our main evidence room for you. Please make sure your incident narrative includes your actions in handling this evidence & what dryer number(s) you left them in.
   - Items from the same person can be placed in the same locker, but *each item* must be entered into Spillman *INDIVIDUALLY* (pairs can be combined under one item number, i.e., socks and shoes).

7. **Place CSI request *AND* locker key(s) inside envelope (both are provided in tray below).**

8. **Slide envelope underneath interior door into the CSI lab (the door to the left). This will serve as our "notice" that there is something to be packaged in the lockers.**
   - If you forgot something or need to add any items, use a new locker. Do not attempt to get into the now "locked" locker.

DO NOT remove keys from this room

Once you enter this room, you should not need to remove any items from it.