



**SAN DIEGO POLICE DEPARTMENT  
CRIME LABORATORY**



# **Crime Scene Unit Manual**

**Approved: July 1, 2019**

Approved By: Joe Berner, Supervising Crime Scene Specialist  
Crime Scene Unit Manual  
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## 1.0 INTRODUCTION

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This document has been developed with the objective of providing guidelines regarding the policies and procedures of the San Diego Police Department Crime Scene Unit. This document shall provide clear and concise instructions on the proper methodology for processing evidence and processing crime scenes, as well as an in depth overview of the training required prior to being allowed to do independent casework.

### TERMINOLOGY

The following terminology is used throughout this document:

- “shall” - requirement
- “should” - recommendation
- “may” - with permission
- “can” - possibility/capability

This terminology is used to be consistent with the International Organization for Standardization (ISO) and ANSI National Accreditation Board (ANAB).

- **PPE (Personal Protective Equipment)** which consists of *at least* a lab coat, a mask and gloves. PPE is used as a protection barrier and to prevent contamination and cross contamination.
- **Contamination** refers to any physical evidence (DNA, trace evidence, etc.) that can come off of a person and potentially affect the item of evidence being examined/processed. PPE helps eliminate the possibility of contaminating an item of evidence.
- **Cross contamination** refers to physical evidence being transferred from one item to another. This is prevented by wearing proper PPE and keeping workspaces clean. Bleach shall be used to clean workspaces. Anytime an item other than the item of evidence is touched, a new pair of gloves shall be donned. A clean piece of butcher paper shall be used for each item of evidence.
- **“Master” DVD** refers to a disc containing original digital images.
- **“Working Copy” DVD** refers to a disc containing enhanced digital images. The images are the same images as found on the “Master” DVD, but have been enhanced to be more functional (i.e. rotated, lightened).
- **“Visible Prints”** refers to the presence of any ridge detail.

## **1.1 UNIT DESCRIPTION AND FUNCTIONS**

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### **ANAB Section 6.2.2.1 / ISO/IEC 17025:2017(E) Section 6.2.2**

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General office hours are 0630 to 1700 hours, Monday through Friday. Crime Scene Specialists are on 24-hour call back. Crime Scene Specialists respond to all homicides and officer-involved shootings, and are available for all other types of investigations (i.e. suspicious deaths and sex crimes). Crime Scene Specialist services are requested by a sergeant (or above), the watch commander, or laboratory supervisors.

The Crime Scene Unit consists of one Supervising Crime Scene Specialist and eight Crime Scene Specialists (CSS). The Crime Scene Specialist photographs and collects evidence at crime scenes, autopsies, searches (warrants, 4<sup>th</sup> Waiver and consent), vehicle processing(s), and subject processing(s). Additionally, they process evidence for latent prints, trace evidence and possible DNA evidence. Crime Scene Specialists give expert testimony in court relating to their scope of work.

Civilians fill all positions within the Crime Scene Unit. The position of Crime Scene Specialist requires the following education:

- Completion of an Associate of Science degree, or higher, in Forensic Technology  
**OR**
- Completion of an Associate of Science degree, or higher, in another field and a certificate in Forensic Technology.

The Crime Scene Unit utilizes Interns and/or Volunteers to process evidence and to assist Crime Scene Specialists at crime scenes.

### **TECHNICAL SUPPORT**

The Crime Scene Unit shall use Interns and Volunteers to fill the position of Technical Support.

The following qualifications are required for the position:

- Be 18 years of age or older.
- Have a valid California Driver License.
- Pass the department background process.
- Commit to working for one year, at a minimum of 16 hours a week, between the hours of 0630 and 1700, Monday through Friday.
- Must have completed the following courses (or equivalent):
  - Fingerprint Identification
  - Advanced Fingerprint Identification
  - Basic Forensic Technology
  - Basic Forensic Photography
  - Advanced Forensic Photography

Technical Support personnel shall be trained in the identification, collection and preservation of latent prints, DNA evidence, trace evidence, shoe/tire impressions, and blood evidence. Upon completion of this training, the Technical Support Trainee shall be

competency tested in the aforementioned areas. They shall have ninety days to complete their training and pass their competency test.

If the Technical Support Trainee passes the competency test, they shall start performing independent casework. Technical Support personnel shall not be allowed to work on homicide cases.

Technical Support personnel may be allowed to attend crime scenes under the supervision of a Crime Scene Specialist. They shall not be allowed to take photographs and/or collect items of evidence. However, thirty days after passing the competency test and working on independent casework, the Technical Support personnel may be allowed to assist the Crime Scene Specialist with processing for latent print evidence in the field (including homicide cases). If they assist with processing and/or collect latent prints in the field, they shall be required to create a note page which shall be included with the Crime Scene Specialist's report.

## **1.2 TRAINING**

**ANAB Sections 6.2.2.2, 6.2.3.1 and 7.7.4 / ISO/IEC 17025:2017(E) Sections 6.2.2, 6.2.3 and 6.4.12**

### **CRIME SCENE SPECIALIST TRAINEES**

Crime Scene Specialist Trainees shall be trained in evidence processing and crime scene processing. During training, the following areas shall be covered:

- General forensic science knowledge and general forensic science terminology.
- Ethical practices in the forensic science field.
- Criminal law procedures, as they pertain to the forensic science field.
- Policies, procedures and set up of equipment in the Crime Scene Unit, including, but not limited to cameras, the superglue fuming chambers and the fingerprint development chamber. Trainees shall become familiar with the proper settings required to produce desirable results (i.e. time of fuming in the superglue chamber so that the items of evidence are not over fumed).

Training shall be conducted by the Supervising Crime Scene Specialist or a Crime Scene Specialist assigned to training.

### **EVIDENCE PROCESSING**

To begin training, Crime Scene Specialist Trainees shall be trained in evidence processing. Trainees shall be trained in the identification, collection and preservation of latent prints, DNA evidence, blood evidence and trace evidence. There are four modules of training for evidence processing:

- Module 1: Barcode System, Photography, Cyanoacrylate Ester Fuming, Magnetic Powder, Black Powder, Evidence Handling and Packaging, and Note Page Documentation.
- Module 2: Alternate Light Source, Fluorescent Powder, and Mikrosil
- Module 3: Sticky-Side Powder, Gentian Violet, and Ninhydrin.
- Module 4: DNA evidence, Blood evidence, Trace evidence, and proper documentation of additional items collected.

The trainer shall demonstrate the correct processes involved in the module(s) and then shall allow the trainee to practice and become comfortable with the methodology and proper documentation. The trainers shall be available for questions and assistance. The trainees shall be given an assignment for each module by the trainer. The assignment shall reflect the methodology and processes of the current module, including those learned in previous modules (if applicable). The Supervising Crime Scene Specialist (with input from the trainer) has the ultimate responsibility of determining whether or not the trainee has successfully displayed understanding of the methodology and processes presented in the module. It is up to the Supervising Crime Scene Specialist whether the trainee continues onto subsequent modules or requires additional training/practice.

Upon successful completion of all modules, the trainee shall be competency tested on evidence processing. The test shall be administered by the Supervising Crime Scene Specialist and shall consist of a practical test and a written test. The trainee is expected to

complete the test with minimal non-technical mistakes, if any. If the trainee makes technical mistakes during the test, they shall be retrained in the fundamentals of evidence processing, prior to attempting the competency test a second time. If the trainee passes both parts of the test, they shall start performing casework. The trainee shall be required to have a co-signer on five cases, prior to being allowed to perform independent casework.

Refer to the Crime Scene Unit Training Manual for all documents regarding evidence processing training.

## **CRIME SCENE PROCESSING**

Crime Scene Specialist Trainees should not respond to crime scenes prior to the completion of evidence processing training. Prior to performing any work at crime scenes, the Supervising Crime Scene Specialist shall review all camera equipment with the trainee. The Supervising Crime Scene Specialist shall do a training of how the camera operates and provide a brief understanding of how to properly document a crime scene with the trainee.

The trainee shall complete the following (at the least):

- *Observe* the work of an experienced Crime Scene Specialist at *four* scenes.
- Be trained on a mock crime scene by an experienced Crime Scene Specialist or the Supervising Crime Scene Specialist.
- Successfully complete a competency test in crime scene processing.
- *Collect* evidence at *two* scenes under the direct supervision of an experienced Crime Scene Specialist.
- *Photograph* *two* scenes under the direct supervision of an experienced Crime Scene Specialist.
- *Photograph* and *collect* evidence at *three* additional scenes under the direct supervision of an experienced Crime Scene Specialist.
- *Photograph* and *collect* evidence (to include fingerprint processing) at *two* vehicle processing(s) under the direct supervision of an experienced Crime Scene Specialist.

The Supervising Crime Scene Specialist (with input from the trainer) has the ultimate responsibility of determining whether or not the scene/vehicle qualifies as an event that is appropriate for training. It is up to the Supervising Crime Scene Specialist whether the trainee continues onto subsequent scenes or requires additional training. All reports generated by the trainee during training shall be co-signed by the training Crime Scene Specialist.

Upon successful completion of the crime scene training, the trainee shall process at least one scene under the supervision of the Supervising Crime Scene Specialist. This scene shall be considered the final competency test for crime scene processing. The number of scenes processed in this manner shall be at the discretion of the supervisor. The trainee is expected to complete the scene(s) with minimal non-technical mistakes, if any. If the trainee makes technical mistakes during the processing of the scene, they shall be retrained in the fundamentals of crime scene processing, prior to processing another scene (attempting the competency test a second time). If the trainee successfully processes the scene(s), they shall start performing independent casework.



Moot court shall be arranged for each trainee, as a part of Crime Scene Processing training. Trainees should not be allowed to perform independent casework until the moot court exercise is completed.

### **TRAINED CRIME SCENE SPECIALISTS**

Trained Crime Scene Specialists shall be proficiency tested in evidence processing and intralaboratory tested in crime scene processing at least once a year.

The evidence processing proficiency test will be external. The analyst shall use the correct documentation, the correct techniques, the note pages shall be complete and accurate, policies and procedures were followed, and all prints identified and preserved. Passing is achieved through using proper techniques as required by laboratory procedures, and recovering prints consistent with the test manufacturer's preparation and summary results.

The intralaboratory test shall be setup by the Supervising Crime Scene Specialist. Crime Scene Specialists shall take all required photographs, identify, collect and preserve all items of evidence, take the proper notes, and write a complete and accurate report.

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### **1.3 GENERAL HOUSEKEEPING**

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#### **OFFICE AREA**

Evidence shall not be handled or stored in the office areas of the Crime Scene Unit. Evidence shall be stored in an evidence locker/shelf/drawer, refrigerator and/or freezer.

#### **INVENTORY/EVIDENCE PROCESSING ROOMS**

The laboratory benches and hoods shall be cleaned with bleach before and after use. Clean butcher paper shall be used for each item of evidence. It is the duty of the Crime Scene Specialists to keep the Inventory/Evidence Processing Rooms stocked at all times. If supplies are low, the Crime Scene Specialist shall write the item on the "Supply Order Request" list. The supplies shall be ordered (if possible) by the individual tasked with ordering.

##### *Drying Hoods*

Drying hoods shall be cleaned with bleach before and after use. Butcher paper shall be used to line the bottom of the hood and the wooden dowels (if applicable) when drying evidence. The "Hood Cleaning Log" shall be completed by the Crime Scene Specialist every time a hood is used.

The self-contained hoods require filters to be changed. There are three types of filters: a carbon/heap filter, a main pre-filter and a standard door filter. These filters shall be changed as needed.

#### **CRIME SCENE UNIT STUDIO**

The Crime Scene Unit Studio is used for processing subjects (suspects, victims, witnesses, etc.). This room shall be inspected and made safe prior to processing a subject. The desk shall be cleaned with bleach before and after use. A new piece of butcher paper shall be put on top of the desk prior to use. At the completion of the subject processing, the Crime Scene Unit Studio shall be cleaned by the processing Crime Scene Specialist. It is the duty of the Crime Scene Specialists to keep the Crime Scene Unit Studio stocked at all times.

#### **STINK TANK**

The stink tank is used for drying items of evidence. It is used when there is no space available in the drying hoods in the Crime Scene Unit or when items of evidence are covered in insects or have a strong odor. The shelves in the stink tank shall be cleaned with bleach before and after use.

Butcher paper shall be used to line the shelves prior to use. The "Hood Cleaning Log" shall be completed by the Crime Scene Specialist every time the stink tank is used.

## 2.0 WORK REQUESTS

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The Clerical Unit logs all incoming requests and distributes the request(s) to the Supervising Crime Scene Specialist, who then distributes the request(s) to Crime Scene Specialists to be worked. The name of the assigned Crime Scene Specialist or Technical Support and the date of receipt of the laboratory request(s) shall be entered into the tracking database by the Supervising Crime Scene Specialist. Vehicle requests and “RUSH” evidence processing requests shall be assigned as soon as possible.

When the Crime Scene Specialist receives a request, they shall check out the evidence items from the Property Room and/or Narcotics Vault, unless the evidence items are being processed prior to impound. If any request requires additional information from another unit, the Crime Scene Specialist should consult with the corresponding unit(s) for assistance. If assistance is provided, a note should be added to the note pages of the report. The assisting individual should initial and date the note. Upon completion of processing evidence for a request, the Crime Scene Specialist performing the casework shall generate the appropriate documentation and report(s).

### *Special Circumstances:*

- Cartridge cases shall not be processed for latent prints or possible DNA evidence by Crime Scene Specialists.
- Cartridges shall be processed for latent prints, but shall not be processed for possible DNA evidence by Crime Scene Specialists.
- Shotgun shells (expended and unexpended) shall be processed for latent prints and possible DNA evidence.
- Cigarette butts shall go to the Forensic Biology Unit for DNA analysis, prior to any attempt at latent print development.

## **2.1 CHECKING OUT AND RETURNING EVIDENCE TO THE PROPERTY ROOM AND/OR NARCOTICS VAULT**

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### **ANAB Section 7.4.1.1 / ISO/IEC 17025:2017(E) Section 7.4.1**

When checking out evidence, a “Named List” shall be made. A “Named List” includes incident numbers, item numbers and the current location of the item(s) of evidence. This enables Property Room/Narcotics Vault personnel to locate evidence efficiently and effectively.

To create a “Named List,” first create a worklist with the items of evidence needed in the barcode system. This is done by searching for the barcodes needed and adding each individual item to the worklist. Once the worklist is complete, query worklist items by clicking on the “File” tab, scrolling down to “Worklist” and clicking on “Query Worklist Items.” This will pull all barcodes into a single list. To create a “Named List,” click on the “Reports” tab, scroll down to “External Reports” and click on “15 Named List.” If only one item of evidence is needed from the Property Room/Narcotics Vault, simply search for the barcode and continue with creating a named list (a worklist is not necessary).

The generated list is given to Property Room/Narcotics Vault personnel. Once all of the evidence is retrieved, Property Room/Narcotics Vault personnel shall check out the evidence to the Crime Scene Specialist. A signature is needed from the Crime Scene Specialist. The Crime Scene Specialist shall ensure that all evidence is sealed upon receiving it. If an item is not sealed, the Crime Scene Specialist shall ask Property Room personnel to seal it (if possible) prior to returning to the Crime Scene Unit.

The evidence will be returned to the Property Room or Narcotics Vault when the work is completed. All evidence impounded shall be sealed by the Crime Scene Specialist. Evidence will generally be returned to the Property Room or Narcotics Vault by the person who signed it out and will be returned to the location the item(s) was checked out from.

Evidence received from the Property Room and/or Narcotics Vault shall not be kept in the Crime Scene Unit for longer than ninety days. Evidence may be held in the Crime Scene Unit for longer than ninety days with approval from the supervisor.

## **2.2 REPACK POLICY FOR NARCOTICS ITEMS TO BE PROCESSED**

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For general narcotics evidence, the evidence will be repackaged by the Forensic Chemistry Unit. The narcotic substance shall be retained in the Narcotics Vault. A new barcode shall be generated for the empty container/package and shall be impounded in the Narcotics Vault. The Crime Scene Specialist shall then check out the empty packaging/container for processing.

The following items are exceptions for repackaging and can be checked out by the Crime Scene Specialist:

- Cases with drugs packaged in large bricks.
- Cases with drugs packaged in very small items, such as balloons.

These items cannot be repackaged without destroying possible DNA evidence and fingerprint evidence.

## **2.3 EVIDENCE PROCESSING PROCEDURES**

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### **ANAB Section 7.4.1.1 / ISO/IEC 17025:2017(E) Sections 7.4.1**

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Proper PPE shall be worn at all times when handling evidence in the laboratory.

Prior to physically working on evidence, the laboratory bench being used shall be cleaned with bleach and then covered with butcher paper. An additional piece of clean butcher paper shall be used for each item of evidence being examined/processed. When work is completed, the laboratory bench shall be cleaned with bleach.

Prior to placing items in the superglue tank, racks shall be exposed to ultraviolet light for at least fifteen minutes in one of the ultraviolet hoods or by using the ultraviolet lights in the superglue chamber. The racks can then be placed into the superglue chamber and evidence can be placed on them for further processing.

If processing evidence with powders (black, magnetic, fluorescent, etc.), work shall be done at one of the plenum wall stations or inside of a hood. If an item of evidence is too large, a table or counter may be used for processing purposes. When working at one of the stations (plenum counter or inside a hood) in the processing room, the plenum wall/hood shall be on while working on evidence. A piece of clean butcher paper shall be used for each item of evidence being examined/processed. A new brush and powder shall be used on each item of evidence (different barcode/package separately). If using a magnetic wand, it shall be bleached prior to being used on a new item of evidence.

Most chemical processing (i.e. ninhydrin) shall be done in a hood. The hood shall be turned on when working on evidence. When the chemically processed evidence is dry, it shall be removed from the hood. A "CAUTION CHEMICALLY TREATED EVIDENCE" sticker should be adhered to the packaging of any evidence processed with chemicals.

## **2.4 BARCODES FOR EVIDENCE PROCESSING SUB-ITEMS**

### **ANAB Section 7.4.1.1 / ISO/IEC 17025:2017(E) Sections 7.4.1 and 7.4.2**

When processing evidence, latent print cards and/or discs containing digital images/scans, swabs of possible DNA evidence, swabs of apparent blood evidence, and trace evidence can be collected. These items are considered sub-items (including in the barcode system) and require barcodes to be generated. All sub-items shall be barcoded.

The minimum fields that shall be documented in the barcode system are:

- Incident number and case number (if applicable).
- Charge(s).
- Incident date.
- Station Impounded.
- Recovered by and Recovery date and time.
- Recovery address and recovery location.
- Assigned Detective and Investigative Unit.
- Victim / Suspect / Owner (if known).
- Evidence hold, Category and Item type.
- Item description.

All latent print related evidence (for a single case) should be barcoded together as a single item. Latent print cards and/or discs shall be placed in a Latent Print Envelope labeled with the case information. If digital images/scans of fingerprints were taken, a "Master" DVD and a "Working Copy" DVD shall be created. The sleeve containing the "Master" DVD shall be sealed inside of the Latent Print Envelope. The sleeve containing the "Working Copy" DVD shall remain unsealed inside of the Latent Print Envelope. After a barcode is generated for the Latent Print related evidence, a "Prop/Narc" barcode label shall be printed and attached to the outside of the envelope. The Latent Print Envelope shall be sealed after the Technical Review process is completed and impounded in the Property Room.

One barcode shall be generated for swabs of possible DNA evidence and swabs of apparent bloodstains (if applicable) collected for an item(s) with the same barcode. If more than one swab was collected, each swab (envelope) shall be designated a letter (A, B, C, etc.). Each envelope containing a swab(s) shall be labeled and sealed individually. After a barcode is generated for the collected item(s), a "CSU" barcode label shall be adhered to each envelope. The swabs that are collected from the same item (labeled A, B, C, etc.) shall be placed in a larger envelope together, which shall also be sealed and labeled with a barcode label. All sealed and barcoded swabs (envelopes) shall be placed in a Freezer Packet labeled with the case information. The Freezer Packet shall not be sealed.

***The Freezer Packet containing the swabs and/or trace evidence shall be placed in the freezer no more than seventy-two hours after collection.***

All other items (i.e. apparent hair) can have a barcode generated individually or, if they are like items (collected from the same item/barcode), can be barcoded in the same manner as swabs (see above). Apparent hair collected shall be placed in the Freezer Packet labeled with the case information. The Freezer Packet shall not be sealed.

All evidence collected shall be impounded in the Property Room, unless narcotics related.

Any sub-items collected from the processed evidence shall be accounted for in the barcode system. These items shall be referenced in the comments section of the original item (the item that was processed). When adding notes into the comments section, the author's initials, ID number and date the note was added shall be included.



### 3.0 DOCUMENTATION OF EVIDENCE WITH PHOTOGRAPHY

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Photography is a non-intrusive technique used for documentation purposes. It should be used in many different situations, whether it be documenting an item of evidence *as is* or documenting fingerprints on an item.

#### **MATERIALS AND EQUIPMENT**

- Camera.
- Lens.
- Scale(s).
- Camera stand/tripod (if needed).
- Filter(s) (if needed).
- Light source (if needed).
- Shutter release cable (optional).

#### **SAFETY CONCERNS**

There are no safety concerns regarding the photographic process.

#### **SAFETY EQUIPMENT**

The Crime Scene Specialist is required to wear the following (when in the laboratory):

- Lab coat.
- Mask.
- Gloves (when handling evidence).

#### **NOTE PAGE PHOTOGRAPHY**

When processing evidence, it is important to document the item(s) of evidence *as is*, prior to manipulating the item(s) in any way. Note page photographs are used to document the item(s) of evidence and shall be used in the final case packet.

Each item of evidence shall be photographed on a clean piece of butcher paper. The barcode or placard (if a barcode has not been generated yet) of the item, the Crime Scene Specialist's initials and ID number, and the current date shall be present in all note page photographs. A ruler shall be present when photographing items of evidence at ninety degrees. Any photographs not taken at ninety degrees should have the ruler removed. If collecting evidence, excluding possible DNA evidence from an item of evidence, it shall be photographed in place with a scale, prior to collection.

"Master" note page photographs shall be stored on the G-Drive. They shall be uploaded to the "Lab Images" folder, under the year the case took place. Clerical personnel shall move the uploaded folders to the "Case File" folder.

If the evidence being processed is in relation to a case worked by the Crime Scene Specialist and a Crime Scene Unit Report is going to be generated, discs of the images are required. A "Master" DVD and a "Working Copy" DVD containing all note page photos shall be created, barcoded and impounded in the Property Room.

## PHOTOGRAPHS OF FINGERPRINTS

Photography is a non-intrusive technique that is often vital in the preservation and documentation of fingerprints (visible and developed).

There are many situations when photography should be used to document fingerprints. These photographs shall be taken after initial photographs (note page photographs) are taken of the item(s). Crime Scene Specialists should photograph fingerprints when one of the following situations exists:

- When prints are visible, including when prints appear to be in blood.
- If there is a concern that there could be difficulty lifting prints.
- When prints are going to be subjected to additional processing and can be damaged.
- When prints are developed with chemical methods and can fade or disappear over time.
- When prints are detected with fluorescent techniques.

## PROCEDURES

### *Photographing Fingerprints on a Camera Stand in the Photography Room*

Each item of evidence shall be photographed on a piece of clean butcher paper, unless using a backlight in which case the surface shall be bleached. The butcher paper shall be placed on the platform underneath the camera (on the camera stand). Place the item of evidence on the butcher paper and position it underneath the camera lens. Make sure the area containing the print is in the frame by looking through the viewfinder. **(NOTE: Photographs of prints should be taken at at least 1000 ppi. Charts that indicate the ppi at different heights of the camera are available and displayed for the cameras in the photography room. The maximum height refers to the furthest point that the camera can be positioned to remain at at least 1000 ppi.)** If a photograph is taken at less than 1000 ppi, it shall be noted on the **disc**. Once the item is positioned, place a scale (ruler) in the frame vertically or horizontally in relation to the print. The ruler shall have the barcode of the item, the Crime Scene Specialist's initials and ID number, and the current date written on it.

When the evidence is properly positioned, prepare the camera by making sure the file type is set to **TIFF** and determining if filters are required (refer to the Fluorescent Photography section below). The exposure mode, ISO and aperture will need to be determined. When possible, the ISO should be set to 100 or lower. The exposure mode will generally be set to Manual on the cameras in the photography room. The ISO and aperture can be set directly on the camera or through the Camera Control program on the computer. Refer to the camera manual if necessary.

Prior to taking a photograph, a folder for the case being worked shall be created. Each Crime Scene Specialist should have a folder with their name on the D-Drive. Create a new folder

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with the case number or incident number under the appropriate Crime Scene Specialist. Each case folder shall contain a "Master" folder and a "Working" folder. Once the folders have been created, set up the correct destination for the photographs that will be taken (refer to the instructional documents for the camera setup being used). The photographs shall be labeled with an image number, a brief description of the item and the barcode of the item.

Take the photograph. Light sources are available to aid in photography. Once the photographs are taken and the "Master" image is saved, the "Master" photographs shall be converted into one-to-one images and a copy shall be saved in the "Working" folder. One-to-one images are created using Adobe Photoshop. The "Working" photographs shall be labeled with an image number, a brief description of the item, the barcode of the item and 1-1. If an image is enhanced, it shall be noted in the image name and saved with all other "Working" photographs.

Example of labeled images:

Master Images: Image\_01\_Cell Phone\_12345678

Working Images: Image\_01\_Cell Phone\_12345678\_1-1

Enhanced Images (Working): Image\_01\_Cell Phone\_12345678\_1-1\_Enhanced

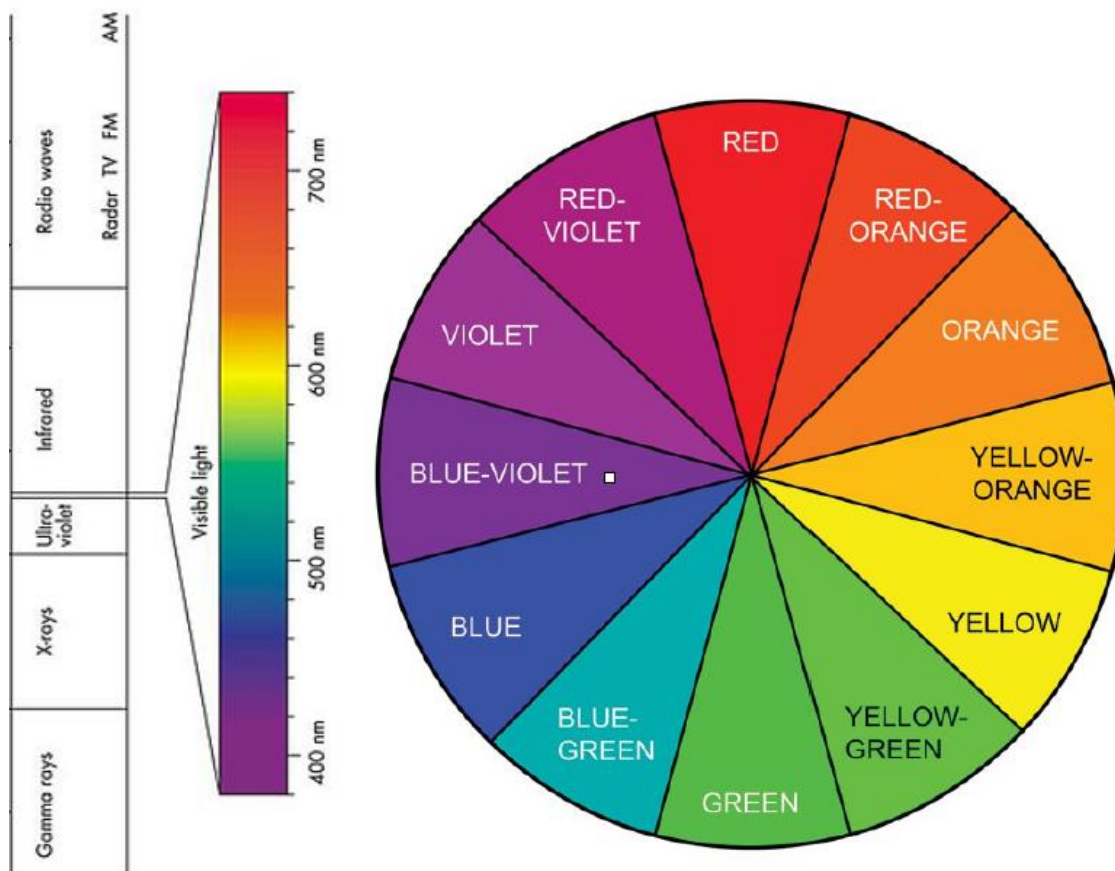
A "Master" DVD and a "Working Copy" DVD shall be created for all of the photographs taken. The "Master" DVD shall be sealed. The discs shall be placed in a Latent Print Envelope labeled with the case information, along with any lifts collected (if applicable). The discs shall be labeled with the following information:

- Incident Number and Case Number (if applicable).
- "Master" or "Working Copy."
- Crime Scene Specialist's initials and ID number.
- Images contained on the disc.
- Date first photograph was taken.

### *Fluorescent Photography*

The basic procedures for fluorescent photography are similar to those of photography of fingerprints using available light. However, fluorescent photography requires the use of an Alternate Light Source (ALS) and filters. An Alternate Light Source generally has an array of light at different wavelengths. Combined with the filters, visualization and documentation of prints is possible. Without a filter, the prints tend to wash out from the light being used. The most common filters used are orange, yellow and red.

Filters help block out unwanted wavelengths of light and allow desired wavelengths of light to pass through the filter, resulting in fluoresced prints. The wavelength of light will determine the affect the filter has on the print. The background will lighten with a filter of the same or similar color, but will darken with a filter of a complementary color. Therefore, filters of a complementary color to the color of light being used will be the most effective in visualizing prints with fluorescence. The electromagnetic spectrum and the color wheel provides a guide to determining the color filter needed with various wavelengths of light. Refer to Figure 1 and Table 1.



**Figure 1.** This figure represents the Electromagnetic Spectrum and the classic color wheel. Using these images, the color of the filter necessary to visualize fluoresced prints can be determined.

Filter	Color of Light that Darkens Background	Color of Light that Lightens Background
Yellow	Blue	Yellow, Green and Red
Orange	Blue and Green	Orange
Red	Blue and Green	Red

**Table 1.** This table demonstrates what color(s) of light darken and lighten the background when used with the three primary filters.

To photograph fluorescent prints, the area must be dark (turn off the lights and close the doors). A number of different combinations of filters and wavelengths of light may need to be tested until a clear image of the print(s) is visualized. If necessary, refer to Figure 1 and Table 1 for guidance. Photographs shall be taken in the same manner as those using available light. The wavelength(s) of light and the filter(s) used when viewing the item shall be documented in the note pages, along with the wavelength of light and filter used to capture each photograph.

## NOTES

When photographing prints on a round or uneven surface, close the aperture of the lens (a higher f-stop) for a greater depth of field. This will allow more, if not all, of the print to be in sharp focus. If unable to photograph the print in a single photograph, rotate the item and take multiple photographs to document the entire print.

Occasionally when examining and photographing prints on highly reflective surfaces, green light that interferes with the prints is detected. This interference can be removed by adding an additional filter of the same color.

## REFERENCES

1. National Institute of Justice, et al. *The Fingerprint Sourcebook*. July 2014.
2. United States Department of Justice Federal Bureau of Investigation Laboratory Division. *Processing Guide for Developing Latent Prints*. Revised 2000.
3. Police Scientific Development Branch (London). *Scene of Crime Handbook of Fingerprint Development Techniques*. 1993.

### 3.0.1 DCS DIGITAL CAPTURE SYSTEM

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This equipment allows the capture, enhancement and printing of high resolution images of fingerprints, palm prints and footmarks using a SLR digital camera. This system allows printing of these images, protecting valuable evidence from alteration or loss.

The clarity of images can also be enhanced prior to comparison and identification using image processing software. The software provides overall control of various steps of capturing, validating, processing and printing an image. Many functions can be performed automatically, thereby minimizing the workload of the operator. Disc burning software allows images and other data to be transferred to a disc.

Operating Procedures for the DCS:

Log on to the DCS system.

In the “Captured image” area of the main DCS screen, add the following information to set up folders:

Case: incident number

Use the barcode number

Image Image#1

Ensure that the focus point on the camera matches the “Calibration” information in the “Calibration” area of the main screen. Set the correct camera settings in the “Camera Settings” area of the main screen. Preview the image. If everything is correct, “Capture Evidence” to take the digital image.

Capture the image using a SLR camera or a scanner. A validated image is automatically saved to the “D:\DCS\Working Folder.” A working copy of the image appears on screen to allow enhancements.

The individual analyst will determine which steps, if any, to take in the enhancement process. If the analyst determines enhancements are needed, the following documentation is required in the case notes:

- Note that the "DCS system" was used.
- Note which tool bar(s) were used (such as: Ninhydrin, Powders, US \$, etc.) on each image.

Click “Enhancement.” Click “Convert To.” Click “Gray Scale 8.”

Approved By: Joe Berner, Supervising Crime Scene Specialist  
Crime Scene Unit Manual

July 1, 2019

Save the working image. It will be placed into the "D:DCS\Working Folder" under the incident number you input on the main screen. Burn two copies of the correct folder to a disc. Label one "Master" and one "Working," and seal the "Master" one.

The two discs will be assigned a barcode number and impounded in the Property Room. An audit trail will be included with every folder and will be included on the disc. A "Maintenance Log" will be kept with the system. Any maintenance and software/hardware upgrades will be maintained in this log.

### **3.1 INHERENT LUMINESCENCE**

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Inherent luminescence occurs when compounds found in latent print residue luminesce when exposed to a laser or an alternate light source without any processing needed. This occurrence is rare, but is a possibility. Compounds found in perspiration and body oils, such as lipids and amino acids, which are components commonly found in latent print residue, can fluoresce when exposed to a laser or an alternate light source. Additionally, latent prints residue can contain foreign substances, such as inks and make-up, that can potentially fluoresce under the appropriate light source.

#### **MATERIALS AND EQUIPMENT**

- Laser or alternate light source.
- Laser/Filter goggles.

#### **SAFETY CONCERNS**

Use caution when using the laser or alternate light source. Do not point directly at the skin or eyes. There are no safety concerns regarding the photographic process.

#### **SAFETY EQUIPMENT**

The Crime Scene Specialist is required to wear the following (when in the laboratory):

- Lab coat.
- Mask.
- Gloves (when handling evidence).
- Laser/Filter goggles (when using an alternate light source).

#### **PROCEDURE**

Examine the evidence with the laser or an alternate light source. If a light source with multiple wavelengths of light is used, the evidence can be viewed under each wavelength with the appropriate filter. Photograph any prints that are observed. Refer to Section 3.0 for the proper documentation procedures using photography and the proper documentation required in the notes.

#### **ADDITIONAL TECHNIQUES OF SEQUENTIAL PROCESSING**

After documenting any prints observed using the laser or alternate light source (if applicable), proceed in processing the item of evidence using the appropriate techniques.



## **NOTES**

Sexual assault cases are the most conducive to this type of examination, due to the fact that biological fluids tend to exhibit inherent luminescence.

## **REFERENCES**

1. United States Department of Justice Federal Bureau of Investigation Laboratory Division. *Processing Guide for Developing Latent Prints*. Revised 2000.

### **3.2 CYANOACRYLATE ESTER (SUPERGLUE) FUMING USING THE MVC5000 CHAMBER**

---

Cyanoacrylate ester fuming (also known as superglue fuming) is a well-established method for developing latent prints on nonporous and semi-porous surfaces. This technique involves introducing high concentrations of superglue vapor and water vapor into a desired environment. The superglue vapors (monomers) bond with the residues in fingerprints one by one to form a chain (polymer). The polymerization of the superglue vapors with the fingerprint residues creates a white deposit making the once latent print visible. Cyanoacrylate ester fuming stabilizes/fixes prints to items, which is ideal for further examination and enhancement of any developed prints.

Constant positive results require that the operating conditions are closely controlled.

#### **MATERIALS AND EQUIPMENT**

- Cyanoacrylate chamber with proper distilled or nanopure water levels.
- Cyanoacrylate liquid.
- Aluminum foil dish.
- Plastic bottle with distilled or nanopure.

#### **CONTROL**

Place a fresh fingerprint on a black card. A new control shall be placed in the chamber prior to every fuming cycle. A positive control will result in a white colored print.

#### **SAFETY CONCERNS**

Cyanoacrylate ester fumes can irritate the mucous membranes. The chamber is equipped with a self-extracting (purge) system that will removed all vapors prior to opening the door. In the glue form, it will bond skin and skin to other objects. Extreme heat can create cyanide gas.

#### **SAFETY EQUIPMENT**

The Crime Scene Specialist is required to wear the following:

- Lab coat.
- Mask.
- Gloves.

## **PROCEDURES**

### *Start-Up and Processing*

Turn on the power supply (separate from the chamber door control panel). This unit will normally remain on at all times. Push/touch the power button on the chamber door control panel.

Open the chamber door by pushing/touching the door button and turning the door handle clockwise to a vertical position. NOTE: A purge cycle may be necessary prior to being able to open the chamber door. Place clean (UVed) shelves in the chamber and place items of evidence to be superglued on the shelves. Make sure that the evidence does not come in direct contact with the chamber walls. If placing a large item in the chamber that will not fit on the shelves, use butcher paper to line the chamber and place the item on the butcher paper. Items can also be hung from the bars at the top of the chamber. Be sure to bleach and/or UV the hooks prior to placing evidence on them.

When finished placing evidence inside of the chamber, pour cyanoacrylate liquid into an aluminum foil dish and place it on the heating plate in the chamber. Be sure the heating plate is clean prior to placing the foil dish on it. Place the weighted ring over the aluminum foil dish to ensure proper heat coverage. NOTE: The amount of cyanoacrylate liquid needed will depend on the amount of evidence placed in the chamber. Fill the humidifier water reservoir with the proper amount of distilled or nanopure water. Place the control on a clip inside of the chamber. The control should be placed in a location that allows monitoring during the fuming process.

Close the chamber door and turn the handle counterclockwise to a horizontal position. Press down on the handle to ensure that the door is locked.

NOTE: The chamber is neither self-closing nor self-locking. There is no danger of becoming trapped inside.

Push/touch the Auto cycle button for the fuming process to start. The Halt button can be pushed/touched to stop the process prior to the heating of the glue. The chamber will stop the process and allow the door to open. Once the fuming process begins, the chamber must complete the 40 minute purge cycle prior to allowing the door to open.

When the process is complete and the screen indicates that the door can be opened, open the door, and remove and discard the aluminum foil dish. An aluminum dish should never be reused as dangerous gases can form. Check the control to ensure the fuming process was successful. Remove the evidence from the chamber and continue processing the items.

### *The Treatment Cycle*

**Humidify Cycle:** Water is evaporated from the internal humidifier tank to raise the relative humidity inside of the chamber to an adequate level (normally 80%). This can take 5 to 15 minutes depending on the number and type of items loaded in the chamber and the ambient humidity.

**Glue Cycle:** Superglue is evaporated by heating the aluminum foil dish and allowing the polymer to deposit on the fingerprint residue. This will take 15 minutes unless a different glue cycle time is entered in the setup menu (between 10 and 80 minutes). The glue dish will be heated to and maintained at a temperature of 120°C throughout the glue cycle. The humidifier will continue to operate to maintain the humidity at an adequate level.

**Purge Cycle:** The concentration of airborne superglue vapor in the cabinet is reduced to a safe level by circulating the air through activated charcoal filters. This will take 40 minutes. If there is a fault in one of the purge fans/filter units, a double purge cycle of 80 minutes will be performed. The time should not be changed for this cycle.

### *Auto or Manual Cycle*

The control system of the chamber allows the unit to be used in the auto or manual treatment cycle mode.

**Auto Cycle Mode:** After starting the treatment cycle by pushing/touching the Auto Cycle button, it runs to completion without any further intervention. The auto treatment cycle can be halted at any time by pressing halt.

**Manual Mode:** The separate process cycles (humidify, glue and purge) must be started by pushing/touching the Humidify cycle, Glue cycle, and Purge cycle buttons in turn, at the correct time. The manual treatment cycle can be halted at any time by pressing halt. Manual mode offers the operator a more flexible method of ensuring satisfactory development of latent prints.

### *Changing the Glue Cycle Time*

The glue cycle time (CT) can be set to a time between 10 and 80 minutes. To change the glue cycle time, push/touch the Menu button to enter the setup menu. The screen display should display the current time set for the glue cycle. Push/touch the up and down arrows to increase or decrease the cycle time. Once the desired time is displayed, push/touch the menu button. The screen display will read "Setup Menu - Exit." Push/touch the up arrow or down arrow to exit the setup menu and return to standby mode.

### *Cleaning the Glass*

When cleaning the glass inside of the chamber, use glass cleaner (i.e. Windex) and paper towels. WypAll towels should not be used inside of the chamber.

### *Carbon Filters*

The internal computer system will alert the user when the two carbon filters in the chamber door need to be changed. This occurs approximately every eighty fuming cycles. The cycles will be displayed on the chamber door control panel.

A Filter Change Log shall be maintained for each chamber, indicating the date the filters were changed and by whom.

### **SPECIAL NOTICE**

The carbon filters and the humidifier wick must be changed at the proper intervals. Refer to the manufacturer's instructions in the user guide for proper procedures for changing these parts.

### **NOTES**

When using the Auto mode, the MVC5000 chamber will normally develop most prints. It is recommended by the manufacturer to keep a log of the different items processed that require longer or shorter glue cycle times.

The walls in the chamber are made of double laminated glass. The glass should not be impacted with evidence or other items.

The viewing screen on the door will indicate any faults detected and display the fault(s) so that corrective measures can be taken.

### **ADDITIONAL TECHNIQUES OF SEQUENTIAL PROCESSING**

The following techniques are most commonly used after cyanoacrylate ester fuming:

- Photography (to document and preserve).
- Dye Staining.
- Fluorescent examination.
- Powdering.
- Lifting.

NOTE: Additional techniques can be used and should be performed if necessary.

### **REFERENCES**

1. Mason Vectron Forensic Science Equipment MVC5000 Instruction Manual and User Guide.
2. National Institute of Justice, et al. *The Fingerprint Sourcebook*. July 2014.

### **3.3 CYANOACRYLATE ESTER (SUPERGLUE) FUMING USING A CYANOACRYLATE FUMING CABINET**

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#### **MATERIALS AND EQUIPMENT**

- Cyanoacrylate packet or liquid glue in a dish.
- Cyanoacrylate fuming cabinet.
- Clips to suspend evidence.
- Beaker with warm water.
- Tongs.
- Small fan.

#### **CONTROL**

Place a fresh fingerprint on a black card. A new control shall be placed in the cabinet prior to every fuming cycle. A positive control will result in a white colored print.

#### **SAFETY CONCERNS AND PROCEDURES**

Cyanoacrylate ester fumes can irritate the mucous membranes. In the glue form, it will bond skin and skin to other objects. Extreme heat can create cyanide gas.

When opening any cyanoacrylate fuming cabinets, ensure that the exhaust hoods are operational. Do not attempt to remove items from the cabinet until all of the fumes are exhausted.

#### **SAFETY EQUIPMENT**

The Crime Scene Specialist is required to wear the following:

- Lab coat.
- Mask.
- Gloves.
- Eye Protection (recommended when unloading the cabinet or applying the glue).

#### **PROCEDURES**

Place the evidence in the cyanoacrylate fuming cabinet. Evidence shall be placed on clean surfaces (butcher paper or UVed/bleached surfaces). Place a beaker of warm water and the control inside of the cyanoacrylate cabinet. Open a glue packet or pour liquid glue into a dish and place it in the cabinet. Turn on the small fan to circulate the fumes. Close the cyanoacrylate fuming cabinet. Prints will usually develop within 30 minutes (a large cabinet can take longer). After an appropriate amount of time has elapsed, examine the control to see if development has taken place. If successful, remove the items of evidence from the

cabinet and continue processing. If development has not yet occurred, the process can be repeated. NOTE: It is best to perform this process in several short intervals rather than long intervals to avoid over-development.

#### **ADDITIONAL TECHNIQUES OF SEQUENTIAL PROCESSING**

The following techniques are most commonly used after cyanoacrylate ester fuming:

- Photography (to document and preserve).
- Dye Staining.
- Fluorescent examination.
- Powdering.
- Lifting.

NOTE: Additional techniques can be used and should be performed if necessary.

#### **REFERENCES**

1. United States Department of Justice Federal Bureau of Investigation Laboratory Division. *Processing Guide for Developing Latent Prints*. Revised 2000.
2. Police Scientific Development Branch (London). *Scene of Crime Handbook of Fingerprint Development Techniques*. 1993.

### 3.4 MAGNETIC POWDER AND BLACK POWDER

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The use of powders is one of the oldest and most common methods used in the development of latent prints. There are many different types of fingerprint powder. When choosing what powder(s) to use, the type of surface being processed should be considered. Two of the most common powders used are magnetic powder and black powder. The fine particles that make up the powders adhere to the aqueous and oily components in latent print residue.

#### MATERIALS AND EQUIPMENT

##### *Magnetic Powder*

- Magnetic powder.
- Magnetic wand/brush.

##### *Black Powder*

- Black powder.
- Fingerprint brush.

#### SAFETY CONCERNS

Long exposure to the powder being use can cause respiratory problems. Avoid inhaling the fingerprint powder.

#### SAFETY EQUIPMENT

The Crime Scene Specialist is required to wear the following (when in the laboratory):

- Lab coat.
- Mask.
- Gloves (when handling evidence).

#### PROCEDURE

Place a small amount of powder on a clean piece of butcher paper or in a clean bag (when in the field). If using magnetic powder, bleach the magnetic wand prior to being used. If using black powder, use a new fingerprint brush for each item being processed. Apply a small amount of powder to the brush/wand by dipping the brush/wand into the powder. Additional powder can be applied later if necessary. Lightly dust the area being processed for latent prints. After dusting, carefully examine the area(s) to see if any prints developed. If prints develop, document and collect the prints (if possible). Refer to Sections 3.0 and 3.21 for proper procedures for photographing prints and lifting prints, respectively.

NOTE: In the laboratory, powdering should be performed at one of the plenum wall stations or inside of a hood in the processing room. If an item of evidence is too large, a table or counter can be used for processing purposes.



## **ADDITIONAL TECHNIQUES OF SEQUENTIAL PROCESSING**

The following techniques are most commonly used after powdering:

- Photography/Scanning (to document and preserve).
- Lifting.
- Blood Processing (if applicable).
- Tape Processing (if applicable).
- Ninhydrin (if applicable).

NOTE: Additional techniques can be used and should be performed if necessary.

## **DNA CONSIDERATIONS**

Never dip the brush/wand directly into the container of powder. Use a separate reservoir of powder and discard any leftover powder and the container used (if applicable).

If DNA evidence is important in different areas on an item (i.e. handle and blade of a knife used in a stabbing, driver area and passenger area in a vehicle), use a new brush and powder to avoid cross contamination between areas.

## **REFERENCES**

1. National Institute of Justice, et al. *The Fingerprint Sourcebook*. July 2014.
2. Fisher, Barry A.J. and David R. Fisher. *Techniques of Crime Scene Investigation*. Eighth Edition. 2012.
3. United States Department of Justice Federal Bureau of Investigation Laboratory Division. *Processing Guide for Developing Latent Prints*. Revised 2000.
4. Police Scientific Development Branch (London). *Scene of Crime Handbook of Fingerprint Development Techniques*. 1993.

### **3.5 DFO (1,8-DIAZAFLOUREN-9-ONE)**

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DFO (1,8-Diazafluoren-9-One) is a ninhydrin-like analogue that reacts with the amino acids present in latent print residue. Like ninhydrin, DFO is used to develop prints on paper and other porous materials. DFO is more sensitive than ninhydrin and produces a fluorescent, pink to red result. While some prints developed with DFO can be visible to the naked eye, the use of an alternate light source can increase the visibility of developed prints. DFO can be used in conjunction with ninhydrin as long as DFO is applied first.

#### **MATERIALS AND EQUIPMENT**

- DFO Solution Preparation:
  - DFO.
  - Methanol.
  - Ethyl acetate.
  - Glacial acetic acid.
  - Petroleum ether.
- Laser or alternate light source.
- Dry heat source.

#### **CONTROL**

Place a fresh fingerprint on a piece of paper or porous material and treat with the DFO solution. A positive control will result in a pink to red color and/or may require an alternate light source for visualization. A control shall be tested for each batch of DFO solution prepared.

#### **SAFETY CONCERNS AND PROCEDURES**

DFO can be harmful if swallowed and may irritate the eyes. Avoid ingestion. In case of contact, immediately flush eyes with water.

The preparation and application of the DFO solution should be conducted in a fume hood.

#### **SAFETY EQUIPMENT**

The Crime Scene Specialist is required to wear the following:

- Lab coat.
- Mask.
- Gloves.
- Eye protection (recommended).
- Laser/Filter goggles (when using an alternate light source).

## PROCEDURE

### *Solution Preparation*

The following proportions of reagents should be carefully measured and used to prepare DFO solution:

- 1.0g DFO
- 200mL Methanol
- 200mL Ethyl Acetate
- 40mL Glacial Acetic Acid
- 2L Petroleum Ether

Weigh/Measure out the appropriate amount of reagents and combine all but the petroleum ether. Stir the solution until the DFO is dissolved. Dilute the solution by adding the petroleum ether in a large enough container. The DFO solution should be a clear, gold color. Prepared solutions should be stored in dark-colored bottles/containers. NOTE: A control shall be tested for each batch of DFO solution prepared and should only be used if the control tests positive.

### *Processing*

Dip or spray the item of evidence with the DFO solution. Allow the evidence to air dry. An oven or dry heat may be used to expedite development. NOTE: It has been reported that when the application and drying process is repeated, there is a greater success of latent print development. Once dry, examine the item of evidence with a laser or alternate light source using the appropriate filters. Refer to Section 3.8 for proper procedures for using the Polilight PL500 alternate light source. Document any developed prints. Refer to Section 3.0 for the proper documentation procedures using photography and the proper documentation required in the notes.

## ADDITIONAL TECHNIQUES OF SEQUENTIAL PROCESSING

The following techniques are most commonly used after DFO:

- Photography (to document and preserve).
- Ninhydrin.
- Physical Developer.

NOTE: Additional techniques can be used and should be performed if necessary.

## REFERENCES

1. National Institute of Justice, et al. *The Fingerprint Sourcebook*. July 2014.
2. Fisher, Barry A.J. and David R. Fisher. *Techniques of Crime Scene Investigation*. Eighth Edition. 2012.
3. United States Department of Justice Federal Bureau of Investigation Laboratory Division. *Processing Guide for Developing Latent Prints*. Revised 2000.

### **3.6 FLUORESCENT POWDER**

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Fluorescent fingerprint powder is an extremely fine textured powder that acts like other fingerprint powders by adhering to the aqueous and oily components in latent print residue. Fluorescent fingerprint powder is applied using a fiberglass filament fingerprint brush or a feather duster-style fingerprint brush. Two advantages of using fluorescent fingerprint powder are that a very minute amount of powder is necessary to visualize prints using an alternate light source and that fluorescent powder can yield better results on irregular, nonporous surfaces. However, one disadvantage of using fluorescent powder is that it usually only works well on relatively moist or oily prints.

#### **EQUIPMENT AND MATERIALS**

- Fluorescent fingerprint powder.
- Fiberglass filament or feather duster-style fingerprint brush.
- Laser or alternate light source.

#### **SAFETY CONCERNS**

Long exposure to the powder being use can cause respiratory problems. Avoid inhaling the fingerprint powder.

#### **SAFETY EQUIPMENT**

The Crime Scene Specialist is required to wear the following:

- Lab coat.
- Mask.
- Gloves (when handling evidence).
- Laser/Filter goggles (when using an alternate light source).

#### **PROCEDURE**

Place a small amount of powder on a clean piece of butcher paper. A new fiberglass filament/feather duster-style fingerprint brush or a used brush that has been designated to fluorescent powder should be used for application. Apply a small amount of powder to the item by dipping the brush into the powder and lightly dusting the area being processed for latent prints. Additional powder can be applied later if necessary. After dusting, examine the evidence with a laser or an alternate light source. Refer to Section 3.8 for proper procedures for using the Polilight PL500 alternate light source. Photograph any prints that are observed. Refer to Section 3.0 for the proper documentation procedures using photography and the proper documentation required in the notes.

NOTE: Powdering should be performed at one of the plenum wall stations or inside of a hood in the processing room. If an item of evidence is too large, a table or counter can be used for processing purposes.

### **ADDITIONAL TECHNIQUES OF SEQUENTIAL PROCESSING**

The following technique is most commonly used after powdering:

- Photography (to document and preserve).

NOTE: Additional techniques can be used and should be performed if necessary.

### **DNA CONSIDERATIONS**

Never dip the brush/wand directly into the container of powder. Use a separate reservoir of powder and discard any leftover powder and the container used (if applicable). If using a used brush that has been designated to this technique, it is important to note that any DNA evidence can be compromised and should not be collected.

### **REFERENCES**

1. National Institute of Justice, et al. *The Fingerprint Sourcebook*. July 2014.
2. Fisher, Barry A.J. and David R. Fisher. *Techniques of Crime Scene Investigation*. Eighth Edition. 2012.
3. United States Department of Justice Federal Bureau of Investigation Laboratory Division. *Processing Guide for Developing Latent Prints*. Revised 2000.
4. Police Scientific Development Branch (London). *Scene of Crime Handbook of Fingerprint Development Techniques*. 1993.

### **3.7 DYE STAINING (ARDOX, RHODAMINE 6G, RADIANT ORANGE)**

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Dye staining is a technique used that has been proven to be extremely effective for developing and enhancing prints that have been fumed with cyanoacrylate. There are a number of different dye stains, such as Ardrox, Rhodamine 6G and Radiant Orange. Fluorescent dyes are used in conjunction with an alternate light source.

#### **MATERIALS AND EQUIPMENT**

- Fluorescent dye solution. See below for the materials needed.
- Laser or alternate light source.

#### **CONTROL**

The control for dye stains requires a two-step process. Place a fresh fingerprint on a piece of a black latent print card or piece of acetate and place in the cyanoacrylate ester fuming chamber. After the fuming process is complete, the control should result in a white colored print. The control shall then be treated with the fluorescent dye solution being used, allowed to dry completely and examined with a laser or alternate light source. A fluorescent print should be visible with a positive control. A control shall be tested for each batch of fluorescent dye solution prepared.

#### **SAFETY CONCERNS**

Some fluorescent dyes are considered to be carcinogens. Inhalation can cause irritation to the respiratory tract. Avoid ingestion of solvents used with the dyes as this can be harmful and can result in death.

The preparation and application of fluorescent dye solutions should be conducted in a fume hood.

#### **SAFETY EQUIPMENT AND PROCEDURES**

The Crime Scene Specialist is required to wear the following:

- Lab coat.
- Mask.
- Gloves.
- Laser/Filter goggles (when using an alternate light source).

## PROCEDURE

### *Solution Preparation – Rhodamine 6G and Radiant Orange*

The following proportions of reagents should be carefully measured and used to prepare Rhodamine 6G or Radiant Orange solution:

- .01g Rhodamine 6G or Radiant Orange
- 1L Methanol

Weigh/Measure out the appropriate amount of reagents and combine them in a large enough container. Stir the solution until the Rhodamine 6G/Radiant Orange is dissolved. Prepared solutions should be stored in dark-colored bottles/containers. NOTE: A control shall be tested for each batch of solution prepared and should only be used if the control tests positive.

### *Solution Preparation – Ardrox*

The following proportions of reagents should be carefully measured and used to prepare Ardrox solution:

- 2mL Ardrox P133D
- 10mL Acetone
- 25mL Methanol
- 10mL Isopropanol
- 8mL Acetonitrile
- 945mL Petroleum Ether

Measure out the appropriate amount of reagents and combine them in a large enough container in the order listed. Prepared solutions should be stored in dark-colored bottles/containers. NOTE: A control shall be tested for each batch of solution prepared and should only be used if the control tests positive.

### *Processing*

After evidence has been fumed with cyanoacrylate, apply an even coat of the dye solution. If using Rhodamine 6G or Radiant Orange, the excess dye should be rinsed with methanol using a rinse bottle. Rinsing is not recommended when using Ardrox. Allow the evidence to dry completely. Once the evidence is dry, examine the evidence with a laser or an alternate light source. Refer to Section 3.8 for proper procedures for using the Polilight PL500 alternate light source. Photograph any prints that are observed. Refer to Section 3.0 for the proper documentation procedures using photography and the proper documentation required in the notes.

NOTE: Evidence should be left in a fume hood during the drying process. If an item of evidence is too large, a table or counter can be used for processing purposes.

## **ADDITIONAL TECHNIQUES OF SEQUENTIAL PROCESSING**

The following techniques are most commonly used after dye staining:

- Reapplication of dye solution to increase the luminescence of prints (if necessary).
- Photography (to document and preserve).
- Powdering.
- Lifting.

NOTE: Additional techniques can be used and should be performed if necessary.

## **NOTES**

Fingerprint powders can interfere with the fluorescence examination and therefore should be applied after the fluorescent dye solution. Additionally, the application of a fluorescent dye solution often enhances the powdering process by creating prints that are easier to lift.

It is important to allow the items of evidence to completely dry after applying a fluorescent dye solution. When the solution is not dry and the item is still wet, it will fluoresce so brightly that it can be difficult to visualize developed prints.

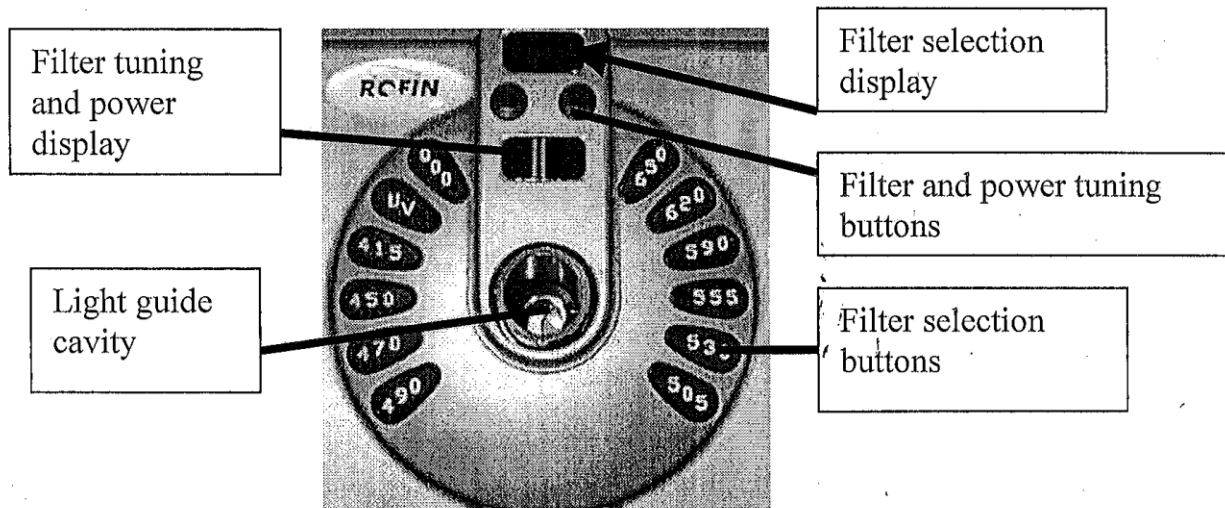
## **REFERENCES**

1. National Institute of Justice, et al. *The Fingerprint Sourcebook*. July 2014.
2. United States Department of Justice Federal Bureau of Investigation Laboratory Division. *Processing Guide for Developing Latent Prints*. Revised 2000.
3. Police Scientific Development Branch (London). *Scene of Crime Handbook of Fingerprint Development Techniques*. 1993.
4. North Carolina Department of Justice Digital/Latent Evidence Section. *Technical Procedure for Rhodamine 6G*. Version 2. October 2013.



### 3.8 POLILIGHT PL500 ALTERNATE LIGHT SOURCE

Alternate light sources can be used to visualize bodily fluids, such as semen and urine, and prints developed with certain chemicals. The Polilight PL500 is an alternate light source with twelve selectable and tunable filters. These twelve filters range from white light to infra-red light. The front control panel (Figure 2) allows for easy transition between filters. Refer to Table 2 for the complete list of filters that the Polilight PL500 offers.



**Figure 2.** This figure represents the front control panel of the Polilight PL500.

Band/Wavelength	Color	General Application
400-680nm	White light band	General Searching (footprints)
350nm	Ultraviolet band	General Searching (fingerprints)
415nm	Violet (blood filter)	Blood prints, spatter, gunshot residue
450nm	Blue	General Searching (semen, urea, fibers)
470nm	Blue	General Searching (ninhydrin prints)
490nm	Blue	General Searching (semen, urea, fibers)
505nm	Blue/Green	Superglue and ninhydrin treated prints
530nm	Green	DFO treated prints, background reduction
555nm	Green/Orange	DFO treated prints, background reduction
590nm	Orange	Ninhydrin treatments, background reduction
620nm	Orange/Red	Ninhydrin treatments, background reduction
650nm	Red	Ninhydrin treatments, background reduction
IR	Infra-red	

**Table 2.** This table demonstrates the selectable filters offered with the Polilight PL500, the color and the general application of each filter as proposed by Rofin Australia Pty. Ltd.

## **MATERIALS AND EQUIPMENT**

- Polilight PL500 alternate light source.
- Filters.

## **CONTROL**

If using the Polilight PL500 for the detection of bodily fluids, a quality control check should be conducted using known biological fluid stain standards prior to examining evidence. The standards should be checked using the different wavelengths of light that the evidence/area will be examined with. The standard should fluoresce with a positive control.

## **SAFETY CONCERNS**

Alternate light sources can be harmful to the eyes and skin. Long-term exposure to the light should be avoided. The light should not be in close proximity with skin.

## **SAFETY EQUIPMENT**

The Crime Scene Specialist is required to wear the following:

- Lab coat.
- Mask.
- Gloves (when handling evidence).
- Filter goggles.

## **PROCEDURE**

To set up the Polilight PL500, place the unit on a solid surface and attach the light guide with the black focusing unit attached to it to the Polilight unit. Make sure the light guide is locked into position and that there is an area around the unit for sufficient air flow. Power on the unit by turning on the power switch located on the back of the unit. To select a specific filter, press the button on the front of the unit. The Polilight PL500 will switch to the desired filter once selected. Systematically pass the light over the item being examined. If using the Polilight PL500 for the detection of prints, document any fluorescing prints observed. Refer to Section 3.0 for the proper documentation procedures using photography and the proper documentation required in the notes. If using the Polilight PL500 for the detection of bodily fluids, a fluorescent area should be noted for further analysis and documented (if necessary).

When finished using the Polilight PL500, turn off the unit using the power switch on the back of the unit. Remove the guide light from the unit and place all equipment back into the carrying case.

### *Filter Tuning*

If needed, the filter can be fine-tuned. Filter tuning will decrease the wavelength of light and is used to optimize illumination conditions for specific materials. To fine-tune the filter, use the two circular buttons on the top of the control panel on the front of the unit. Once a different filter is selected, the fine-tuning will reset and will have to be adjusted again if necessary.

### *Power Tuning*

The intensity of the light can be adjusted. To fine-tune the power, hold down the filter selection button (for the filter selected) until the tilt display changes to a power display (P1-P8 will be displayed). The power can be changed by using the two circular buttons on the top of the control panel on the front of the unit (originally the filter tuning buttons). Once the desired power is set, hold down the filter section button again to return to having filter tuning capabilities.

### **NOTES**

For all troubleshooting or additional instructions refer to the Polilight PL500 Version 2 Instruction Manual.

### **ADDITIONAL TECHNIQUES OF SEQUENTIAL PROCESSING**

After documenting any prints/areas observed using the Polilight PL500, proceed in processing the item of evidence using the appropriate techniques.

### **REFERENCES**

1. Rofin Australia Pty. Ltd. Polilight PL500 Version 2 Instruction Manual.

### 3.9 NINHYDRIN

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Ninhydrin is an extremely effective method used for developing latent prints on porous substrates. Ninhydrin reacts with amino acids (commonly found in sweat) in latent print residue. Prints processed with ninhydrin develop in a purple-color, also known as Ruhemann's purple. Acetone ninhydrin and heptane ninhydrin are two types of ninhydrin solutions used. While both are effective in the development of latent prints, these two solutions have different chemical properties which have different effects on certain types of evidence. For example, heptane ninhydrin should be used on items that have ink on them, as acetone ninhydrin dissolves ink and results in the ink completely washing away if used. Acetone ninhydrin should be used on thermal paper, as heptane ninhydrin will turn the paper black. In most cases, either acetone ninhydrin or heptane ninhydrin can be used, but it is important to know the effects these solutions have on different types of evidence.

#### **MATERIALS AND EQUIPMENT**

- Ninhydrin solution. See below for the materials needed.
- Tray.

#### **CONTROL**

Place a fresh fingerprint on a piece of paper or porous material and treat with the ninhydrin solution. A positive control will result in a purple-colored print. A control shall be tested for each batch of ninhydrin prepared.

#### **SAFETY CONCERNS AND PROCEDURES**

Ninhydrin and the solvents used are considered harmful and should not be ingested or inhaled.

The preparation and application of ninhydrin solutions should be conducted in a fume hood (in the laboratory). Prior to processing a crime scene with ninhydrin, all necessary fire hazard precautions shall be taken by turning off all gas at the scene and notifying San Diego Gas and Electric.

#### **SAFETY EQUIPMENT**

The Crime Scene Specialist is required to wear the following:

- Lab coat.
- Mask.
- Gloves.
- Eye protection (recommended).

## PROCEDURE

### *Solution Preparation - Acetone Ninhydrin*

The following proportions of reagents should be carefully measured and used to prepare acetone ninhydrin solution:

- 35g Ninhydrin
- 3.785L (1gal) Acetone (industrial grade)

Weigh/Measure out the appropriate amount of reagents and pour the ninhydrin into the acetone in a large enough container. Stir or shake the solution until the ninhydrin is dissolved. NOTE: A control shall be tested for each batch of ninhydrin solution prepared and should only be used if the control tests positive.

### *Solution Preparation - Heptane Ninhydrin*

The following proportions of reagents should be carefully measured and used to prepare heptane ninhydrin solution:

- 40g Ninhydrin
- 60mL Methanol
- 1000mL Ethyl Acetate
- 3.785L (1gal) Heptane

Weigh/Measure out the appropriate amount of reagents. Put the ninhydrin into a glass beaker that can hold at least 1400mL. Add the methanol to the ninhydrin and place the beaker into a tray of warm water. Stir the solution until the ninhydrin is dissolved. Once the ninhydrin is dissolved, remove the beaker from the warm water and add the ethyl acetate. Stir the solution until thoroughly mixed. Add the solution to the heptane and thoroughly mix. NOTE: A control shall be tested for each batch of ninhydrin solution prepared and should only be used if the control tests positive.

### *Evidence Processing*

Dip or spray the item of evidence with the ninhydrin solution. Allow the evidence to air dry. If using the Caron Fingerprint Development Chamber, allow the evidence to dry for at least one hour before using the chamber. Refer to Section 3.9.1 for the proper procedures for using the Caron Fingerprint Development Chamber. If not using the chamber for further development, allow the evidence to dry and sit for a minimum of ten days. After ten days, examine the item of evidence. Document any developed prints. Refer to Section 3.0 for the proper documentation procedures using photography and the proper documentation required in the notes.

## *Crime Scene Processing*

Proper PPE should be worn in the field, including a department issued respirator. When all safety measures have been taken, spray or brush the ninhydrin solution onto the desired surface(s). After applying ninhydrin, wait a couple of days to allow prints to develop. Examine the areas processed and document any developed prints. Refer to Section 3.0 for the proper documentation procedures using photography and the proper documentation required in the notes.

### **NOTES**

When using ninhydrin, the date of application should be documented in the case notes, along with the use of the Caron Fingerprint Development Chamber (if applicable). If the chamber is not used and evidence is examined at a later time, the date the evidence is examined should be noted in the case notes as well.

Prints developed with ninhydrin can fade over time, therefore, it is important to document any developed prints after processing.

If items have been exposed to moisture prior to processing, physical developer is the best method to use after processing with ninhydrin.

### **ADDITIONAL TECHNIQUES OF SEQUENTIAL PROCESSING**

The following techniques are most commonly used after ninhydrin:

- Photography/Scanning (to document and preserve).
- Physical developer.

NOTE: Additional techniques can be used and should be performed if necessary.

### **REFERENCES**

1. National Institute of Justice, et al. *The Fingerprint Sourcebook*. July 2014.
2. United States Department of Justice Federal Bureau of Investigation Laboratory Division. *Processing Guide for Developing Latent Prints*. Revised 2000.
3. Police Scientific Development Branch (London). *Scene of Crime Handbook of Fingerprint Development Techniques*. 1993.

### **3.9.1 FINGERPRINT DEVELOPMENT CHAMBER (CARON MODEL 6105) FOR NINHYDRIN**

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The application of heat and humidity have been used as methods to develop latent prints in a timelier manner when processing evidence using the techniques of Ninhydrin, 1,2 Indanedione and DFO (to name a few). While a steam iron can be used to expedite the development of latent prints after the application of ninhydrin, the Caron Model 6105 Fingerprint Development Chamber applies heat and humidity in a uniform and stable environment unlike a steam iron.

#### **MATERIALS AND EQUIPMENT**

- Fingerprint Development Chamber with proper distilled or nanopure water levels.
- Plastic bottle filled with distilled or nanopure water.
- Pretreated evidence.

#### **SAFETY CONCERNS AND PROCEDURES**

The unit is capable of reaching temperatures that could result in burns. Caution should be used when opening the door to the unit, placing evidence in the chamber and removing evidence from the chamber.

#### **SAFETY EQUIPMENT**

The Crime Scene Specialist is required to wear the following:

- Lab coat.
- Mask.
- Gloves (when handling evidence).

#### **PROCEDURES**

Evidence should be treated with ninhydrin (acetone or heptane) and allowed to dry for a period of at least one hour prior to using the chamber.

Prior to turning on the unit, be sure the water connections are secured and the exhaust vent is closed. The exhaust vent is located on the back of the chamber. The rubber stopper should be firmly pushed in with the vent placed in an upward position. Once this is done, it is safe to power on the unit.

#### *Temperature and Humidity*

Use the up and down arrow buttons on the temperature control panel to obtain the desired temperature of 80°C. (If the temperature is high, open the door when lowering the

temperature for a faster recovery time). The temperature set point will be displayed in green and the actual temperature of the chamber will be displayed in red.

When using the chamber for fingerprint development processes that require humidity, such as Ninhydrin, the humidity control needs to be enabled. This is done by turning on the humidity control enable switch (indicated with a cloud and raindrops). Once enabled, the steam generator will fill with water and the viewing window will be heated to minimize condensation, allowing viewing into the chamber during processing. (CAUTION: Viewing glass may be hot and cause burns). The humidity set point should be set to a relative humidity of 65%. This can be done by using the up and down arrows on the humidity control panel. (If the humidity is high, open the door when lowering the humidity for a faster recovery time.)

### *Water Levels*

The water tank is located on the left side of the chamber. An adequate level of water is needed for the steam generator to fill properly. The low water level alarm light will turn on if the humidity control is enabled and the steam generator does not fill properly after 30 seconds. If this occurs, the water tank needs to be filled with distilled or nanopure water (be sure to place the cap back on the tank after filling with water). Once the tank has a sufficient amount of water and the steam generator fills properly, the alarm light will reset and turn off. The chamber will not control the humidity if the alarm light is on. If the alarm does not reset, troubleshooting may be necessary (refer to the Caron Model 6105 Fingerprint Development Chamber Operations Manual).

### *Processing*

When the desired humidity and temperature is reached, the timer on the chamber should be set between 3:00 (3 minutes) and 10:00 (10 minutes). This is done by using the four up and down arrow buttons on the timer control panel. The time should not be set for a time lower than three minutes or higher than ten minutes. Once the time is set, load the pre-treated evidence into the chamber, making sure not to touch the evidence with any non-sterile surfaces. Close and lock the door to the chamber. Press the start button (indicated with a sideways triangle) on the timer control panel. When the timer expires, the alarm will buzz, turn red for 3 seconds and then turn off. (NOTE: When the timer expires, the chamber does not turn off in any way. The temperature and humidity will remain the same). Remove the evidence from the chamber. To reset the timer, press the reset button (indicated with a square). This will reset the timer to the initial countdown time. The reset button can also be used to stop the timer at any time.

When evidence is inside of the chamber, a viewing light can be used to observe evidence. To do so, turn on the light switch. **NOTE: Evidence should be monitored during processing to prevent over development. Prints will develop in a purple color, if present.** If the light does not turn on, troubleshooting may be necessary (refer to the Caron Model 6105 Fingerprint Development Chamber Operations Manual).



When the process is complete, remove the evidence from the chamber, view and complete the processing procedure(s) for the evidence.

#### **ADDITIONAL TECHNIQUES OF SEQUENTIAL PROCESSING**

- Photography/Scanning (to document and preserve).

#### **REFERENCE**

1. Caron Model 6105 Fingerprint Development Chamber Operations Manual.

### **3.10 COOMASSIE BRILLIANT BLUE R250**

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Coomassie Blue is a protein stain used to enhance blood prints. While Coomassie Blue can be used on both porous and nonporous surfaces, it is best used on nonporous surfaces due to that fact that it is a dye and will stain porous materials, making it difficult to visualize developed prints. Coomassie Blue results in blue-colored prints when blood is present.

#### **MATERIALS AND EQUIPMENT**

- Coomassie Brilliant Blue solution preparation:
  - Coomassie Brilliant Blue R250
  - Glacial Acetic Acid
  - Methanol
  - Distilled or nanopure water
- De-Staining/Rinse solution preparation:
  - Glacial Acetic Acid
  - Methanol
  - Distilled or nanopure water
- Tray.

#### **CONTROL**

Place a known bloodstain on a piece of acetate and treat with the Coomassie Brilliant Blue solution and rinse solution. A positive control will result in a blue-colored stain. A control shall be tested for each batch of coomassie blue solution prepared.

#### **SAFETY CONCERNS AND PROCEDURES**

Coomassie Brilliant Blue solution and the rinse solution are both corrosive and highly flammable. All sources of ignition should be extinguished and removed prior to using.

The preparation and application of Coomassie Blue solution should be conducted in a fume hood.

#### **SAFETY EQUIPMENT**

The Crime Scene Specialist is required to wear the following:

- Lab coat.
- Mask.
- Gloves.
- Eye protection (recommended).

## PROCEDURE

### *Solution Preparation – Coomassie Brilliant Blue solution*

The following proportions of reagents should be carefully measured and used to prepare Coomassie Brilliant Blue solution:

- 4g Coomassie Brilliant Blue R250
- 40mL Glacial Acetic Acid
- 200mL Methanol
- 200mL Distilled or nanopure water

Weigh/Measure out the appropriate amount of reagents and mix together in a large enough container. NOTE: Do not pour water or alcohols into acids as this can cause a chemical reaction, which can spatter and cause severe burns. Mix the solution until the Coomassie Brilliant Blue R250 is dissolved. NOTE: A control shall be tested for each batch of Coomassie Blue solution prepared and should only be used if the control tests positive.

### *Solution Preparation – De-Staining/Rinse solution*

The following proportions of reagents should be carefully measured and used to prepare de-staining/rinse solution:

- 40mL Glacial Acetic Acid
- 200mL Methanol
- 200mL Distilled or nanopure water

Measure out the appropriate amount of reagents and mix together in a large enough container. NOTE: Do not pour water or alcohols into acids as this can cause a chemical reaction, which can spatter and cause severe burns. Thoroughly mix the solution.

### *Processing*

Dip or spray the item of evidence with the Coomassie Blue solution, then apply the de-staining/rinse solution. Allow the evidence to dry. Once dry, examine the evidence and document any developed prints. Refer to Section 3.0 for the proper documentation procedures using photography.

## NOTES

Coomassie blue can be used after cyanoacrylate ester fuming, powdering, DFO and ninhydrin.

## **ADDITIONAL TECHNIQUES OF SEQUENTIAL PROCESSING**

The following technique is most commonly used after Coomassie Blue:

- Photography/Scanning (to document and preserve).

NOTE: Additional techniques can be used and should be performed if necessary.

## **REFERENCES**

1. Fisher, Barry A.J. and David R. Fisher. *Techniques of Crime Scene Investigation*. Eighth Edition. 2012.
2. United States Department of Justice Federal Bureau of Investigation Laboratory Division. *Processing Guide for Developing Latent Prints*. Revised 2000.
3. Police Scientific Development Branch (London). *Scene of Crime Handbook of Fingerprint Development Techniques*. 1993.

### **3.11 AMIDO BLACK**

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Amido Black is a protein stain used to enhance blood prints. While Amido Black can be used on both porous and nonporous surfaces, it is best used on nonporous surfaces due to that fact that it is a dye and will stain porous materials, making it difficult to visualize developed prints. Amido Black results in blue/black-colored prints when blood is present.

#### **MATERIALS AND EQUIPMENT**

- Amido Black solution preparation:
  - Naphthalene Black 12B or Naphthol Blue Black 10B
  - Acetic Acid
  - Methanol
- Acetic Acid-Methanol solution preparation:
  - Acetic Acid
  - Methanol
- Acetic Acid-Distilled or nanopure water solution preparation:
  - Acetic Acid
  - Distilled or nanopure water
- Methanol.
- Tray.

#### **CONTROL**

Place a known bloodstain on a piece of acetate and treat with the Amido Black solution and rinse solutions. A positive control will result in a blue/black-colored stain. A control shall be tested for each batch of Amido Black solution prepared.

#### **SAFETY CONCERNS AND PROCEDURES**

Amido Black and the solvents used can be harmful when ingested or inhaled.

The preparation and application of the Amido Black solution and rinse solutions should be conducted in a fume hood.

#### **SAFETY EQUIPMENT**

The Crime Scene Specialist is required to wear the following:

- Lab coat.
- Mask.
- Gloves.
- Eye protection (recommended).

## PROCEDURE

### *Solution Preparation - Amido Black solution*

The following proportions of reagents should be carefully measured and used to prepare Amido Black solution:

- 1.0g Naphthalene Black 12B or Naphthol Blue Black 10B
- 50mL Acetic Acid
- 450mL Methanol

Weigh/Measure out the appropriate amount of reagents. Place the Naphthalene Black 12B or Naphthol Blue Black 10B into a clean, dry 1L glass beaker. Add the methanol to the beaker, followed by the acetic acid. NOTE: Do not pour water or alcohols into acids as this can cause a chemical reaction, which can spatter and cause severe burns. Stir with a magnetic stirrer for at least 30 minutes. The solution should be blue/black in color. Transfer the solution into a clean, dry, glass bottle, labeled with the proper information. NOTE: A control shall be tested for each batch of Amido Black solution prepared and should only be used if the control tests positive.

### *Solution Preparation - Acetic Acid-Methanol solution*

The following proportions of reagents should be carefully measured and used to prepare de-staining/rinse solution:

- 100mL Acetic Acid
- 900mL Methanol

Measure out the appropriate amount of reagents. Pour the methanol into a clean, dry 2L beaker. Add the acetic acid to the methanol. NOTE: Do not pour water or alcohols into acids as this can cause a chemical reaction, which can spatter and cause severe burns. Thoroughly mix using a stirring rod. The solution should be colorless. Transfer the solution into a clean, dry, glass bottle, labeled with the proper information.

### *Solution Preparation - Acetic Acid-Distilled or nanopure water solution*

The following proportions of reagents should be carefully measured and used to prepare de-staining/rinse solution:

- 50mL Acetic Acid
- 950mL Distilled or nanopure water

Measure out the appropriate amount of reagents. Pour the Distilled or nanopure water into a clean, dry 2L beaker. Add the acetic acid to the water. NOTE: Do not pour water or alcohols into acids as this can cause a chemical reaction, which can spatter and cause severe burns. Thoroughly mix using a stirring rod. The solution should be colorless. Transfer the solution into a clean, dry, glass bottle, labeled with the proper information.

## Processing

Pour a sufficient amount of methanol into a clean glass container. Immerse the item or the area of interest into the methanol and let sit for at least one hour. Cover the container to avoid the evaporation of the methanol. NOTE: If the item is large and immersion is not possible, the item or area of interest should be heated with a lamp or fan heater for at least one hour. Pour a sufficient amount of the Amido Black solution into a clean, dry glass container to treat the item. This should also be done with the Acetic Acid-Methanol solution and the Acetic Acid-Distilled or nanopure water solution (in separate containers). Immerse the item of evidence in the Amido Black solution until prints develop (2–3 minutes). Next, immerse the item of evidence in the Acetic Acid-Methanol solution and gently rock the containing until the excess dye has been removed from the background. The solution should be changed if it becomes heavily contaminated with dye. Immerse the item of evidence in the Acetic Acid-Distilled or nanopure water solution and gently rock for 30 seconds. The solution should be changed if it becomes heavily contaminated with dye. Allow the evidence to air dry. Once dry, examine the evidence and document any developed prints. Refer to Section 3.0 for the proper documentation procedures using photography.

## ADDITIONAL TECHNIQUES OF SEQUENTIAL PROCESSING

The following techniques are most commonly used after Amido Black:

- Powders.
- Lifting.
- Physical Developer.

NOTE: Additional techniques can be used and should be performed if necessary.

## REFERENCES

1. Fisher, Barry A.J. and David R. Fisher. *Techniques of Crime Scene Investigation*. Eighth Edition. 2012.
2. United States Department of Justice Federal Bureau of Investigation Laboratory Division. *Processing Guide for Developing Latent Prints*. Revised 2000.
3. Police Scientific Development Branch (London). *Scene of Crime Handbook of Fingerprint Development Techniques*. 1993.

### **3.12 SUDAN BLACK**

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Sudan Black is a dye which reacts with the lipid components in latent print residue on nonporous surfaces. The dye solution stains prints blue/black. Due to the dark staining, Sudan Black is not effective on dark-colored surfaces. It has been found to be less sensitive than some other processes for latent fingerprint development, but is useful on oily or greasy nonporous surfaces.

#### **MATERIALS AND EQUIPMENT**

- Sudan Black solution preparation:
  - Sudan Black
  - Denatured ethanol
  - Distilled or nanopure water
- Tray.

#### **CONTROL**

Place a fresh fingerprint on a piece of a black latent print card. A positive control will result in a blue/black-colored print. A control shall be tested for each batch of Sudan Black solution prepared.

#### **SAFETY CONCERNS AND PROCEDURES**

Amido Black and the solvents used are considered harmful and should not be ingested or inhaled.

The preparation and application of Sudan Black solution should be conducted in a fume hood (in the laboratory). Prior to processing with Sudan Black, all sources of ignition must be extinguished due to the flammability of the Sudan Black solution.

#### **SAFETY EQUIPMENT**

The Crime Scene Specialist is required to wear the following:

- Lab coat.
- Mask.
- Gloves.
- Eye protection (recommended).
- Respirator (when in the field).



## PROCEDURE

### *Solution Preparation*

The following proportions of reagents should be carefully measured and used to prepare Sudan Black solution:

- 15g Sudan Black
- 1L Denatured ethanol
- 500mL Distilled or nanopure water

Weigh/Measure out the appropriate amount of reagents and place the Sudan Black in a clean, dry 2L glass beaker. Add the denatured ethanol to the Sudan Black and stir. Add the distilled or nanopure water to the solution and thoroughly mix. The solution should be black in color.

NOTE: Some of the Sudan Black will not dissolve and will remain in a particulate form.

Transfer the solution (and any solid matter) into a clean, dry, glass bottle, labeled with the proper information. NOTE: A control shall be tested for each batch of Sudan Black solution prepared and should only be used if the control tests positive.

### *Processing*

Mix the Sudan Black solution and pour a sufficient amount of the solution into a clean container. Remove any metallic looking film from the surface by blotting with paper. Immerse the item of evidence in the Sudan Black solution for approximately two minutes. Remove the evidence from the solution and rinse with cold, slow running water until all excess dye has been removed. Allow the evidence to air dry. Once dry, examine the evidence and document any developed prints. Refer to Section 3.0 for the proper documentation procedures using photography. NOTE: This process may be repeated if the prints are faintly developed.

## ADDITIONAL TECHNIQUES OF SEQUENTIAL PROCESSING

The following techniques are most commonly used after Sudan Black:

- Photography/Scanning (to document and preserve).
- Lifting.

NOTE: Additional techniques can be used and should be performed if necessary.

## REFERENCES

1. Fisher, Barry A.J. and David R. Fisher. *Techniques of Crime Scene Investigation*. Eighth Edition. 2012.
2. United States Department of Justice Federal Bureau of Investigation Laboratory Division. *Processing Guide for Developing Latent Prints*. Revised 2000.

### 3.13 PHYSICAL DEVELOPER

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Physical developer reacts with components of sweat found in latent print residue and results in gray/black-colored prints. It is used after the application of DFO and/or ninhydrin. Physical developer is useful for processing latent prints on porous surfaces that have been exposed to moisture and has been proven to be very effective on paper currency.

#### **MATERIALS AND EQUIPMENT**

- Physical Developer solution.
- Tray.

#### **CONTROL**

Place a fresh print on a piece of paper or porous material and wet the paper. Treat the paper with the physical developer solution. A positive control will result in a black/gray-colored print. A control shall be tested per use of the physical developer solution.

#### **SAFETY CONCERNS AND PROCEDURES**

Physical developer solution and the solvents used are considered harmful and should not be ingested or inhaled.

#### **SAFETY EQUIPMENT**

The Crime Scene Specialist is required to wear the following:

- Lab coat.
- Mask.
- Gloves.
- Eye protection (recommended).

#### **PROCEDURE**

##### *Solution Preparation*

Commercially prepared solutions are used to produce Physical Developer solution. Place Part "A" (5mL) into a clean 100mL glass beaker. Add Part "B" (90mL) to the beaker. Stir the solution until thoroughly mixed. NOTE: A control shall be tested per use of Physical Developer solution prepared and should only be used if the control tests positive.

## *Processing*

Pour a sufficient amount of the Physical Developer solution into a glass container. Submerge the item of evidence in the solution until saturated. NOTE: Prints may develop at different speeds, therefore, continue the submersion process until prints no longer develop or the background begins to darken. Remove the item from the solution and rinse carefully with cool, slow running water to remove excess solution. Allow the evidence to air dry. Once dry, examine the evidence and document any developed prints. Refer to Section 3.0 for the proper documentation procedures using photography. NOTE: This process may be repeated if the prints are faintly developed.

## **NOTES**

Physical Developer can develop impressions left by rubber gloves and shoes.

## **ADDITIONAL TECHNIQUES OF SEQUENTIAL PROCESSING**

Physical developer is the last technique used in processing porous items.

## **REFERENCES**

1. National Institute of Justice, et al. *The Fingerprint Sourcebook*. July 2014.
2. Fisher, Barry A.J. and David R. Fisher. *Techniques of Crime Scene Investigation*. Eighth Edition. 2012.
3. United States Department of Justice Federal Bureau of Investigation Laboratory Division. *Processing Guide for Developing Latent Prints*. Revised 2000.

### **3.14 VACUUM METAL DEPOSITION**

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Vacuum metal deposition (VMD) is used to process smooth, nonporous surfaces, particularly plastics. It is not very effective on rough surfaces or surfaces that are contaminated (i.e. greasy or oily). Vacuum metal deposition works by depositing a thin layer of metal by evaporating gold and zinc in a vacuum environment. Prints that are developed with vacuum metal deposition are extremely fragile and should be carefully documented immediately.

#### **MATERIALS AND EQUIPMENT**

- Vacuum Metal Deposition chamber.
- Gold shavings.
- Zinc shavings.
- Acetic Acid (for cleaning).

#### **CONTROL**

Place a fresh fingerprint on a test strip. A positive control will result in a gray/silver-colored print. A control shall be tested per use of the vacuum metal deposition chamber.

#### **SAFETY CONCERNS AND PROCEDURES**

Caution should be taken when cleaning the chamber. Avoid inhaling the zinc dust.

#### **SAFETY EQUIPMENT**

The Crime Scene Specialist is required to wear the following:

- Lab coat.
- Mask.
- Gloves.
- Eye protection (recommended).

#### **PROCEDURE**

##### *Start-up and Processing*

Turn on the water and the air and check the indicator lights. Turn on the power, the mechanical pump and the diffusion pump switches. Open the locked panel that has the key (the toggle switches inside are labeled). Flip the first toggle switch to manual mode. Flip the vent toggle up and loosen the door dogs. After the door opens, flip the vent toggle down. Load the gold, zinc, evidence and control into the chamber. Close the door and tighten the door dogs. Flip the rough toggle up.

When the Chamber TC Pressure Gauge reaches approximately 120 millitorr, flip the rough toggle down, the foreline toggle up and the HIVAC toggle up. When the chamber pressure gauge reads 10-4 or higher, turn on the source power switch to the metal sources. Flip the side select toggle to the left (gold source). Turn the power control knob to vaporize the gold. NOTE: Wear protective goggles when viewing. Turn off the source power switch and flip the toggle to the right (zinc source). Turn on the source power switch to the metal sources and turn on the chamber light. Turn the power control knob to vaporize the zinc. Maintain a current level of 19 amps on the current display screen.

View the control card during the zinc phase and quickly turn off the current when the control card begins to darken. To do so, either turn the source power switch off or turn the power control knob to off. Turn off the chamber light. Flip the toggle to the left (gold source). Turn on the source power switch to the metal sources to burn off zinc. Wait approximately sixty seconds for the zinc boats to cool. Flip the HIVAC and the foreline toggles down. Flip the vent toggle up and loosen the door dogs. Remove the evidence from the chamber. Examine the evidence and document any developed prints. Refer to Section 3.0 for the proper documentation procedures using photography. NOTE: Prints will fade and photographs should be taken as soon as possible.

#### *System Shut Down*

Close the chamber door and tighten the door dogs. Flip the rough toggle up until the vacuum interlock indicator light turns on. When the light turns on, flip the rough toggle down. Turn the diffusion pump switch off and wait twenty minutes for the pump to cool. Turn the power switch and the mechanical switch off. Turn off the water and air.

#### *Cleaning the VMD Chamber*

Prepare a 25% solution of acetic acid by mixing one part acetic acid and three parts water. Apply a small amount of the acetic acid solution to a paper towel and wipe the inside of the viewing ports and the glass light covers until the metal coating is removed.

### **PREVENTATIVE MAINTENANCE**

The VMD will normally receive annual preventive maintenance. The maintenance generally consists of the following:

- Cleaning the windows.
- Cleaning the boats.
- Cleaning the lights.
- Checking for leaks (air, water and oil).
- Checking the oil level in the mechanical pump.
- Changing the oil in the mechanical pump (if necessary).

The Crime Scene Specialist or Technical Support personnel that performs the maintenance is required to fill out the maintenance log. The Crime Scene Specialist's initials and ID number, date and a check off of the maintenance performed shall be documented.

## NOTES

Processing with the vacuum metal deposition chamber can interfere with the examination of handwriting, ink, paper and indented impressions, body fluids, fibers, hairs and paint.

## ADDITIONAL TECHNIQUES OF SEQUENTIAL PROCESSING

The following techniques are most commonly used after Vacuum Metal Deposition:

- Photography/Scanning (to document and preserve).
- Powder.
- Lifting.

NOTE: Additional techniques can be used and should be performed if necessary.

## REFERENCES

1. National Institute of Justice, et al. *The Fingerprint Sourcebook*. July 2014.
2. Fisher, Barry A.J. and David R. Fisher. *Techniques of Crime Scene Investigation*. Eighth Edition. 2012.
3. United States Department of Justice Federal Bureau of Investigation Laboratory Division. *Processing Guide for Developing Latent Prints*. Revised 2000.
4. Todd, Steve. *Vacuum Metal Deposition Fingerprint Recovery System FPRC-24B*.

### 3.15 SMALL PARTICLE REAGENT

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Small Particle Reagent (SPR) is a suspension of molybdenum disulphide particles that adhere to lipids found in latent print residue and results in a gray-colored print. Small particle reagent is used on wet nonporous items, especillay in situations when it is not practical to let these items air dry and use other more efficient methods for latent print development. It is also effective on oily surfaces, galvanized surfaces, and surfaces exposed to salt water.

#### MATERIALS AND EQUIPMENT

- Small Particle Reagent solution preparation:
  - Molybdenum Disulphide.
  - Photo Flo.
  - Distilled or nanopure water.

#### CONTROL

Place a fresh print on a piece of acetate and wet it. Apply the small particle reagent to the control. A positive control will result in a gray/silver-colored print. A control shall be tested per use of the small particle reagent solution.

#### SAFETY CONCERNS AND PROCEDURES

The small particle reagent solution and the solvents used are considered harmful and should not be ingested or inhaled.

#### SAFETY EQUIPMENT

The Crime Scene Specialist is required to wear the following:

- Lab coat (recommended in the field).
- Mask.
- Gloves.
- Eye protection (recommended).

#### PROCEDURE

##### *Solution Preparation*

The following proportions of reagents should be carefully measured and used to prepare small particle reagent solution:

- 30g Molybdenum Disulphide
- 1 drop Photo Flo
- 1L Distilled or nanopure water

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Weigh/Measure out the appropriate amount of reagents and place the molybdenum disulphide in a large enough container. Add one drop of Photo Flo to 1L of distilled or nanopure water and add to the container with the molybdenum disulphide. Mix the solution thoroughly and pour into a spray bottle. NOTE: A control shall be tested per use of the small particle reagent solution prepared and should only be used if the control tests positive.

### *Processing*

Shelter the area to be processed from direct water contact. Shake the bottle containing the small particle reagent solution and make sure that the particle matter is suspended. Spray the desired area with the solution and rinse with water. As a print develops, continue spraying and rinsing until there is sufficient contrast. Document any developed prints using photography. Refer to Section 3.0 for the proper documentation procedures using photography. Once the area is dry, lift the developed prints, if possible. Refer to Section 3.21 for the proper procedures for lifting prints.

### **NOTES**

Evidence can be dipped or sprayed with small particle reagent solution. Dipping would be the preferred method in the laboratory. However, small particle reagent is generally used when it is not possible to dry the item/area or when other methods of development are not able to be utilized on the wet surface(s). Therefore, small particle is rarely used in the laboratory and other methods should be utilized. Small particle reagent is generally used in the field in situations with inclement conditions and is utilized by spraying the solution on the desired area(s).

### **ADDITIONAL TECHNIQUES OF SEQUENTIAL PROCESSING**

Being that this technique is generally used due to inclement conditions and other techniques are not able to be utilized, there is little to no documentation on additional techniques to use after small particle reagent. However, if the evidence can be moved to an area (such as the lab) to be dried, other techniques can be used in an attempt to develop latent prints.

### **REFERENCES**

1. Fisher, Barry A.J. and David R. Fisher. *Techniques of Crime Scene Investigation*. Eighth Edition. 2012.
2. Gardner, Ross. *Practical Crime Scene Processing and Investigation*. Second Edition. 2012.



### **3.16 UN-DU (ADHESIVE TAPE SEPARATION)**

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Un-Du is a solution used to remove adhesive tapes, labels, and postage stamps from various surfaces. Un-Du temporarily “neutralizes the adhesive” allowing for easy separation from its applied position. The use of this solution does not interfere with the processing of the adhesive side of the item for latent prints.

#### **MATERIALS AND EQUIPMENT**

- Un-Du solution.
- Scraper tool.

#### **SAFETY CONCERNS AND PROCEDURES**

Un-Du is considered harmful and should not be ingested or inhaled. The vapors from this solution may cause irritation.

The application of Un-Du solution should be conducted in a fume hood. Prior to processing with Un-Du, all sources of ignition must be extinguished due to the flammability of Un-Du.

#### **SAFETY EQUIPMENT**

The Crime Scene Specialist is required to wear the following:

- Lab coat.
- Mask.
- Gloves.

#### **PROCEDURE**

Pour several drops of Un-Du onto the scraper tool and gently apply to the edge of the adhesive item. Allow the solution to move underneath the adhesive, “neutralizing” the adhesive. Use the scraper tool to help remove the adhesive item. Once the item is removed, the Un-Du solution quickly evaporates from both the adhesive and its applied surface.

#### **NOTES**

It is recommended not to apply Un-Du directly to the adhesive item on porous surfaces and to avoid using the scraper tool. Instead, apply the necessary amount of Un-Du to the opposite side/surface of where the adhesive item is located. The solution will soak through the porous item onto the adhesive surface, therefore, allowing easy removal of the adhesive item from the porous item to which it is attached.

## **ADDITIONAL TECHNIQUES OF SEQUENTIAL PROCESSING**

The following techniques are most commonly used after powdering:

- Gentian Violet.
- Sticky-Side Powder.

NOTE: Additional techniques can be used and should be performed if necessary.

## **REFERENCES**

1. Stimac, Jon T. Oregon State Police Forensic Services Division.

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### **3.17 CRYSTAL VIOLET (GENTIAN VIOLET)**

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Crystal violet, or gentian violet, stains the lipid components found in latent print residue and results in violet-colored prints. The primary application of this dye solution is for the visualization of prints on the adhesive side of tape and on surfaces contaminated with grease or oil.

#### **MATERIALS AND EQUIPMENT**

- Crystal Violet/Gentian Violet solution preparation:
  - Crystal Violet/Gentian Violet.
  - Distilled or nanopure water.
- Tray.

#### **CONTROL**

Place a fresh fingerprint on the adhesive side of a piece of tape and treat with the crystal violet/gentian violet solution. The tape used should be similar to the tape being processed. A positive control will result in a violet-colored print. A control shall be tested per use of the crystal violet/gentian violet solution.

#### **SAFETY CONCERNS AND PROCEDURES**

Crystal Violet/Gentian Violet is extremely toxic and should not be ingested or inhaled. Skin contact should be avoided. In case of contact, wash with cold water for a minimum of 5 minutes.

The preparation and application of Crystal Violet/Gentian Violet solutions should be conducted in a fume hood.

#### **SAFETY EQUIPMENT**

The Crime Scene Specialist is required to wear the following:

- Lab coat.
- Mask.
- Gloves.
- Eye protection (recommended).

## PROCEDURE

### *Solution Preparation*

The following proportions of reagents should be carefully measured and used to prepare Crystal Violet/Gentian Violet solution:

- 1.0g Crystal Violet/Gentian Violet
- 100mL Distilled or Nanopure water

Weigh/Measure out the appropriate amount of reagents and add the Crystal Violet/Gentian Violet to the water in a large enough container. Mix the solution until the Crystal Violet/Gentian Violet is dissolved. NOTE: A control shall be tested per use of the Crystal Violet/Gentian Violet solution prepared and should only be used if the control tests positive.

### *Processing*

Pour the Crystal Violet/Gentian Violet solution into a tray. Submerge the item of evidence in the dye solution and move it around allowing the dye solution to pass over the desired area. Remove the item from the solution and rinse the excess dye off of the item with cold, slow running water. Allow the evidence to air dry. Once dry, examine the evidence and document any developed prints. Refer to Section 3.0 for the proper documentation procedures using photography.

## NOTES

The non-adhesive side of adhesive items should be processed prior to using sticky-side powder. Cyanoacrylate ester fuming and careful application of powders can be utilized without interference.

When documenting developed prints, the use of an alternate light source or laser can provide better contrast to aid in the visualization of prints.

## ADDITIONAL TECHNIQUES OF SEQUENTIAL PROCESSING

The following techniques are most commonly used after crystal violet/gentian violet:

- Photography/Scanning (to document and preserve).
- Sticky-Side Powder.

NOTE: Additional techniques can be used and should be performed if necessary.

## REFERENCES

1. Fisher, Barry A.J. and David R. Fisher. *Techniques of Crime Scene Investigation*. Eighth Edition. 2012.
2. United States Department of Justice Federal Bureau of Investigation Laboratory Division. *Processing Guide for Developing Latent Prints*. Revised 2000.

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### 3.18 STICKY-SIDE POWDER

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Sticky-side powder adheres to the lipid and sweat components found in latent print residue and results in white or black prints (depending on the color of the powder used). The solution is used for the visualization of prints on the adhesive side of tape or other adhesive surfaces, such as labels and band-aids.

#### MATERIALS AND EQUIPMENT

- Sticky-Side powder.
- Photo Flo working solution preparation:
  - Photo Flo
  - Distilled or nanopure water
- Soft-bristled paint brush or camel hair fingerprint brush.
- Small mixing container.
- Tray (if applicable).

#### CONTROL

Apply a fresh print to a piece of tape similar to that being processed and apply the sticky-side powder to the tape. A positive control will result in a white or black (depending on the color of the powder used) print. A control shall be tested per use of the sticky-side powder solution.

#### SAFETY CONCERNS AND PROCEDURES

Sticky-side powder and the solvents are considered harmful if ingested or inhaled.

#### SAFETY EQUIPMENT

The Crime Scene Specialist is required to wear the following:

- Lab coat.
- Mask.
- Gloves.

#### PROCEDURE

*Solution Preparation (Photo Flo working solution)*

The following reagents are required to prepare Photo Flo working solution:

- Photo Flo
- Distilled or nanopure water

Fill a rinse (squirt) bottle approximately one-half full with distilled or nanopure water and one-half full with Photo-Flo 200. Shake well to mix thoroughly.

#### *Method #1 (Brushing)*

Determine the proper powder (white or black) to use to ensure good contrast upon development. Place about one teaspoon of sticky-side powder into a small container. NOTE: The amount of sticky-side powder needed may be less or more depending on the amount of evidence to be processed. Add the Photo Flo working solution to the container a little at a time, mixing in between, until the sticky-side powder solution is the consistency of thin paint. Once mixed, use a small brush or camel hair fingerprint brush to apply the solution to the adhesive side of the item being processed. Allow the powder solution to sit on the item for approximately 10 to 15 seconds, then rinse with cold, slow running water. NOTE: If the powder solution is left on the item for too long, it becomes difficult to rinse off. Allow the item to dry. Examine the item and document any developed prints. Refer to Section 3.0 for the proper documentation procedures using photography.

#### *Method #2 (Soaking)*

Determine the proper powder (white or black) to use to ensure good contrast upon development. Add sticky-side powder to a tray containing distilled or nanopure water and agitate to mix. Submerge the item to be processed. Allow the floating particles of the sticky-side powder to settle on the adhesive side of the item. This can take some time to develop latent prints. Remove the item from the solution and allow it to dry. Examine the item and document any developed prints. Refer to Section 3.0 for the proper documentation procedures using photography.

#### *Method #3 (Shaking)*

Determine the proper powder (white or black) to use to ensure good contrast upon development. Add sticky-side powder to a container with a lid and add distilled or nanopure water. Place the lid on the container and shake/agitate until the solution turns into soap suds or foam. Remove the lid and place the item into the solution. Allow the solution to saturate or cover the item for 10 to 20 seconds. Remove the item and rinse thoroughly with cold, slow running water. Allow the item to dry. Examine the item and document any developed prints. Refer to Section 3.0 for the proper documentation procedures using photography.

### **NOTES**

Sticky-side powder can be applied several times to enhance the contrast of the developed print(s).

The non-adhesive side of adhesive items should be processed prior to using sticky-side powder. Cyanoacrylate ester fuming and careful application of powders can be utilized without interference. Sticky-side powder can be used after the application of crystal violet/gentian Violet.

When documenting developed prints, the use of an alternate light source or laser can provide better contrast to aid in the visualization of prints.

#### **ADDITIONAL TECHNIQUES OF SEQUENTIAL PROCESSING**

The following technique is most commonly used after sticky-side powder:

- Photography/Scanning (to document and preserve).

NOTE: Additional techniques can be used and should be performed if necessary.

#### **REFERENCES**

1. United States Department of Justice Federal Bureau of Investigation Laboratory Division. *Processing Guide for Developing Latent Prints*. Revised 2000.
2. Police Scientific Development Branch (London). *Scene of Crime Handbook of Fingerprint Development Techniques*. 1993.

### **3.19 POWDER SUSPENSION SOLUTION**

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Powder suspension solution adheres to the lipid and sweat components found in latent print residue and results in white or black prints (depending on the color of the powder used). The solution is used for the visualization of prints on the adhesive side of tape or other adhesive surfaces, such as labels and band-aids.

#### **MATERIALS AND EQUIPMENT**

- Black or white fingerprint powder.
- Clear Ivory dish soap.
- Soft-bristled paint brush or camel hair fingerprint brush.
- Distilled or nanopure water.
- Plastic disposable container.
- Spoon

#### **CONTROL**

Apply a fresh print to a piece of tape similar to that being processed and apply the powder suspension solution. A positive control will result in a white or black (depending on the color of the powder used) print. A control shall be tested per use of the powder suspension solution.

#### **SAFETY CONCERNS AND PROCEDURES**

The powders and solvents used are considered to be harmful if ingested or inhaled.

#### **SAFETY EQUIPMENT**

The Crime Scene Specialist is required to wear the following:

- Lab coat.
- Mask.
- Gloves.

#### **PROCEDURE**

##### *Solution Preparation*

The following reagents are required to produce powder suspension solution:

- Clear Ivory dish soap.
- Black or white fingerprint powder.
- Distilled or nanopure water

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Determine the proper powder (white or black) to use to ensure good contrast upon development. Mix equal parts water, clear Ivory dish soap and black or white fingerprint powder (in that order) in a clean container. The amounts will vary depending on the size of the item(s) being processed. The solution should be thin. If the solution is too thick, add additional water.

### *Processing*

Use a small brush or camel hair fingerprint brush to apply the solution to the adhesive side of the item being processed. Allow the powder solution to sit on the item for approximately 10 to 15 seconds, then rinse with cold, slow running water. Allow the item to dry. Examine the item and document any developed prints. Refer to Section 3.0 for the proper documentation procedures using photography.

### **NOTES**

The non-adhesive side of adhesive items should be processed prior to using powder suspension solution. Cyanoacrylate ester fuming and careful application of powders can be utilized without interference.

### **ADDITIONAL TECHNIQUES OF SEQUENTIAL PROCESSING**

The following technique is most commonly used after powder suspension solution:

- Photography/Scanning (to document and preserve).

NOTE: Additional techniques can be used and should be performed if necessary.

### **REFERENCES**

1. Southern California Association of Fingerprint Officers. *The Print*. Volume 14(2) pp. 1-2. March/April 1998.
2. Minnesota Division of the International Association for Identification, January 1998 issue of Gopher Identification.

### **3.20 THERMAL PAPER WASHOUT**

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Thermal paper washout is an efficient method for removing the black/gray residue from thermal paper items that were previously processed with ninhydrin. When thermal paper is processed with either acetone based or heptane based ninhydrin, the paper turns black/gray because of a chemical reaction happening between the ninhydrin and the chemical treated thermal paper. When this reaction takes place, the prints that would have been normally visible on porous items are indistinguishable due to the black/gray stain left behind. Thermal paper washout will remove the black/gray residue and the developed ninhydrin prints will be visible.

#### **MATERIALS AND EQUIPMENT**

- Thermal paper washout solution preparation:
  - HFE-7100
  - Denatured Ethanol (85.4%)
- Tray.

#### **CONTROL**

Apply fresh prints to a piece of thermal paper and apply the thermal paper washout solution. A positive control will result in the black/gray residue being washed away. A control shall be tested for every batch of the thermal paper washout solution prepared.

#### **SAFETY CONCERNS AND PROCEDURES**

The solvents used should not be ingested or inhaled and contact with skin should be avoided.

The preparation and application of thermal washout solution should be conducted in a fume hood.

#### **SAFETY EQUIPMENT**

The Crime Scene Specialist is required to wear the following:

- Lab coat.
- Mask.
- Gloves

## **PROCEDURE**

### *Solution Preparation*

The following proportions of reagents should be carefully measured and used to prepare thermal washout solution:

- 210mL or 55mL      HFE-7100
- 40mL or 10mL      Denatured Ethanol (85.4%)

Measure out the appropriate amount of reagents and mix together in a large enough container. Mix the solution thoroughly until the solution turns cloudy. NOTE: A control shall be tested per batch of the thermal washout solution prepared and should only be used if the control tests positive.

Thermal washout solution will be prepared as needed and no storage of the solution is necessary. If there is excess solution, allow the solution to evaporate in the fume hood.

### *Processing*

Make sure the thermal washout solution is thoroughly mixed and pour the solution into a clean shallow tray. After the item has been processed with ninhydrin and allowed to dry, immerse the item into the solution. Gently agitate the solution until the black/gray residue has completely disappeared. Allow the item to dry. Once dry, continue processing the item normally using the ninhydrin protocol. Refer to Section 3.9 for proper procedures using ninhydrin.

## **NOTES**

The thermal washout solution can only be used for one item and the control. The solution will no longer be effective on additional items due to the residue left behind by the previous item.

## **ADDITIONAL TECHNIQUES OF SEQUENTIAL PROCESSING**

The following technique is most commonly used after thermal paper washout:

- Photography/Scanning (to document and preserve).

NOTE: Additional techniques can be used and should be performed if necessary.

## **REFERENCE**

1. University of Tennessee, Law Enforcement Innovation Center.

### 3.21 METHODS OF LIFTING DEVELOPED PRINTS

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Lifting is one method of preserving and collecting developed prints. There are many different methods of lifting developed prints. Tape and Mikrosil are two of the most common methods of lifting. Mikrosil is generally used on abnormal surfaces, where tape cannot be used or would not be effective (i.e. crushed can).

#### **MATERIALS AND EQUIPMENT**

- Tape.
- Mikrosil.
- Latent print cards.
- Scissors.

#### **SAFETY CONCERNS**

Mikrosil can be harmful if ingested.

#### **SAFETY EQUIPMENT**

The Crime Scene Specialist is required to wear the following (in the laboratory):

- Lab coat.
- Mask.
- Gloves (when handling evidence).

#### **PROCEDURE**

##### *Lifting with tape*

Determine the proper type of tape needed and carefully lay the tape over the desired area, trying to avoid creating air bubbles. If necessary, overlap the tape in a manner that will not disrupt visualizing any detail of the developed prints. Lift the tape and lay it on a latent print card. The latent print card(s) shall be filled out in their entirety, including a sketch of the area from which the lift was collected. An arrow shall be marked on both the sketch and the lift indicating a particular direction (i.e. up, north).

##### *Lifting with Mikrosil*

On a clean latent print card (or other clean surface), squeeze the desired amount of Mikrosil. NOTE: The amount of Mikrosil required will vary depending on the size of the area being processed. Squeeze the catalyst onto the Mikrosil. The rule of thumb for the amount of catalyst needed is for every line of Mikrosil used, one line of catalyst should be used. NOTE:

Using more of the catalyst will result in the Mikrosil hardening faster. Using a clean tongue depressor, mix the Mikrosil and the catalyst together until the entire mixture is a light gray color. There should be no white or blue color remaining in the mixture. Using the tongue depressor, apply the Mikrosil mixture to the desired area. The Mikrosil should be applied in a thin layer. Avoid scraping the item during application. Allow the Mikrosil to harden. This will take a few minutes. When dry, lift the Mikrosil and place it (print side up) on a latent print card. Fix the lift to the latent print card using tape. The latent print card(s) shall be filled out in their entirety, including a sketch of the area from which the lift was collected. An arrow shall be marked on both the sketch and the lift indicating a particular direction (i.e. up, north).

## **NOTES**

When collecting fingerprint evidence during evidence processing in the laboratory, brackets shall be placed on the item around the area from which a lift was collected, along with the corresponding latent print card number for that lift.

### 3.22 COLLECTION OF POSSIBLE DNA EVIDENCE AND BIOLOGICAL STAINS

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#### **MATERIALS AND EQUIPMENT**

- Cotton tipped sterile swabs.
- Water ampules.
- Coin envelopes.
- Clasp envelopes.

#### **SAFETY EQUIPMENT**

The Crime Scene Specialist is required to wear the following (in the laboratory):

- Lab coat.
- Mask.
- Gloves (when handling evidence).

#### **PROCEDURE**

##### *Collection of Possible DNA Evidence*

Being careful not to touch the water ampule to the swab, place one to two drops of water on the cotton end of the swab. Additional water can be added, but the swab should be moist, not soaked. Vigorously rub or roll the swab on the desired area. After swabbing the area, put the swab (cotton side down) into a coin envelope and then into a larger clasp envelope. The clasp envelope shall be labeled with the following information:

- What the item is (i.e. One swab of possible DNA evidence).
- From where the item was collected.
- Location where the item was collected (i.e. Crime Scene Unit)
- The Crime Scene Specialist's initials and ID number.

##### *Collection of Stains*

Being careful not to touch the water ampule to the swab, place one to two drops of water on the cotton end of the swab. Additional water can be added, but the swab should be moist, not soaked. NOTE: If swabbing a stain that is still wet, it is not necessary to wet the swab. Roll or rub the swab in the stain to collect a large amount of the stain on the swab. If the stain is small, do not roll the swab in the stain. Instead, concentrate the stain on the tip of the swab. NOTE: "Tip only" should be written on the packaging if the stain is concentrated on the tip of the swab. After swabbing the stain, put the swab (cotton side down) into a coin envelope and then into a larger clasp envelope. The clasp envelope shall be labeled with the following information:

- Identifier/placard (if applicable).
- What the item is (i.e. one swab of an apparent bloodstain).
- From where the item was collected.

- Location where the item was collected (i.e. Crime Scene Unit)
- The Crime Scene Specialist's initials and ID number.
- Date and time of collection.

## NOTES

Items of evidence/Areas should be thoroughly photographed prior to being swabbed or processed in any way.

One barcode shall be generated for swabs of possible DNA evidence and swabs of apparent bloodstains (if applicable) collected for an item(s) with the same barcode. If more than one swab was collected, each swab (envelope) shall be designated a letter (A, B, C, etc.). Each envelope containing a swab(s) shall be labeled and sealed individually. After a barcode is generated for the collected item(s), a "CSU" barcode label shall be adhered to each envelope. The swabs that are collected from the same item (labeled A, B, C, etc.) shall be placed in a larger envelope together, which shall also be sealed and labeled with a barcode label. All sealed and barcoded swabs (envelopes) shall be placed in a Freezer Packet labeled with the case information. The Freezer Packet shall not be sealed.

Items of evidence are generally processed for latent print evidence, prior to swabbing for possible DNA evidence. However, textured areas on an item that are not likely to yield usable fingerprint evidence should be swabbed prior to processing the item for latent print evidence. These areas should be avoided (if swabbed prior) when swabbing the item for possible DNA evidence after latent print processing. Obvious stains (i.e. apparent bloodstains) should be swabbed and collected prior to latent print processing.

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### 3.23 COLLECTION OF TRACE EVIDENCE

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#### MATERIALS AND EQUIPMENT

- Bindles.
- Clasp envelopes.
- Tweezers.
- Sticky notes.
- Trace tape lifts.
- Blade/Razor.

#### SAFETY EQUIPMENT

The Crime Scene Specialist is required to wear the following (in the laboratory):

- Lab coat.
- Mask.
- Gloves (when handling evidence).

#### PROCEDURE

##### *Collection of General Trace Evidence (i.e. Hair and Fibers)*

If trace evidence is observed during the initial examination of an item of evidence in the laboratory, it should be collected prior to processing the item for latent print evidence. Trace evidence can be collected in a number of different ways, including using tweezers and using sticky notes. If the trace evidence can be easily removed from the item of evidence without damaging it, use your fingers or tweezers to place it in a clean bindle. The bindle shall then be placed in a clasp envelope. The adhesive edge of a sticky note can also be used to collect trace evidence. With a clean sticky note, press the adhesive edge on the area of the item thought to contain trace evidence. Once collected, the sticky note shall be placed in a bindle and then placed into a clasp envelope. The packaging shall be labeled with the following information:

- Identifier/placard (if applicable).
- What the item is (i.e. apparent hair).
- From where the item was collected.
- Location where the item was collected (i.e. Crime Scene Unit)
- The Crime Scene Specialist's initials and ID number.
- Date and time of collection.

##### *Collection of Trace Evidence Using Trace Tape Lifts*

A trace tape lift consists of a plastic case lined with an adhesive. To use, open the plastic case (***do not discard the cover***) and peel back the piece of plastic covering the adhesive. The plastic covering the adhesive can be discarded. Press the adhesive to the area being



processed for trace evidence. After pressing the lift to the entire desired area, place the plastic case cover over the adhesive and package the trace lift in a paper bag. The bag shall be labeled with the following information:

- Identifier/placard (if applicable).
- What the item is (i.e. apparent fibers).
- From where the item was collected.
- Location where the item was collected (i.e. 1401 Broadway)
- The Crime Scene Specialist's initials and ID number.
- Date and time of collection.

### *Collection of Paint Samples*

Paint samples are commonly collected when processing vehicles involved in collisions, but can be collected in other cases as well. When collecting paint samples, identify areas that appear to have paint transfer and using a blade or razor, cut around the area and use the edge of the blade to peel the paint up. Be sure to cut and lift down to the bottommost layer. It is important to collect paint samples that represent all layers of paint. The paint samples should be placed into a bindle and then put into a clasp envelope. The envelope shall be labeled with the following information:

- Identifier/placard.
- What the item is (i.e. paint sample).
- From where the item was collected.
- Location where the item was collected (i.e. Traffic Impound Facility)
- The Crime Scene Specialist's initials and ID number.
- Date and time of collection.

NOTE: A control area (area without any paint transfer) should be collected as well. This sample should be collected from a like area to that from which the sample collected (i.e. if a paint sample is collected from the bumper of a vehicle, the control should be collected from a clean area of the bumper).

### **NOTES**

Items of evidence/Areas should be thoroughly photographed prior to trace evidence being collected, or processed in any way.

#### 4.0 CALL-OUT POLICY

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Crime Scene Specialists should work a three person on call rotation (first call, second call and third call). A schedule shall be made in advance and Crime Scene Specialists shall know when they will be on call. When on call, a laboratory van shall be taken home. Crime Scene Specialists should carry their assigned department cell phones with them at all times. It is the responsibility of the Crime Scene Specialist to answer all incoming calls and respond to calls when directed to do so. Crime Scene Specialists shall respond to calls within an hour of receiving a call. If unable to respond within the hour due to unforeseen situations (i.e. traffic), the Crime Scene Specialist shall notify the Sergeant or Detective as soon as possible. When called out to a scene or event, the Crime Scene Specialist shall notify the Duty Supervisor. When in the field, proper identification (i.e. department issued badge) shall be visible.

Sergeants, the Watch Commander and laboratory supervisors are responsible for calling the first call Crime Scene Specialist and the Criminalist (when applicable). The first call Crime Scene Specialist for the week is responsible for fielding all calls and assigning the appropriate Crime Scene Specialist to the scene/event. The Crime Scene Specialist shall complete a call-out form and turn it in to the Supervising Crime Scene Specialist after returning to the laboratory. The Supervising Crime Scene Specialist shall use the information on the call-out form to create a request in Lablynx for tracking purposes only.

The Crime Scene Specialist should advise the Sergeant and/or case detective to call a Criminalist in situations where the required processing is out of their scope of work. The following situations are examples of when a Criminalist should be called:

- Significant blood spatter present requiring reconstruction.
- Signs/indication of cleanup of blood (luminol is wanted).
- Possible presence of semen/bodily fluids (sex crimes).
- Trajectory reconstruction needed.
- Multiple victims present.
- Officer-involved shooting occurred.
- Apparent body dump.

**It is the responsibility of the Sergeant to determine whether or not a Criminalist is wanted/needed.**

The Crime Scene Specialist assigned to the scene shall be the primary Crime Scene Specialist for the case. If additional help is needed to process a subject or respond to a related event, the primary Crime Scene Specialist shall be responsible for calling the next on call Crime Scene Specialist. If there is a change in the rotation by calling the next on call Crime Scene Specialist, the first call Crime Scene Specialist shall be notified (unless otherwise agreed upon).

The primary Crime Scene Specialist shall be responsible for processing evidence from the case and responding to follow up events related to the case, unless otherwise arranged. If the primary Crime Scene Specialist is no longer on call and someone is needed after hours, they shall be given the option to respond. If unable to do so, the first call Crime Scene Specialist shall be responsible for assigning the call to someone in the on call rotation.

It is the responsibility of the first call Crime Scene Specialist to call all Crime Scene Specialists in the rotation if there is a callout and there is a change in the rotation. Notification shall be made as soon as possible between 0700 hours and 2200 hours. If a callout occurs after 2200 hours, the Crime Scene Specialists in the rotation shall not be notified of any changes in the rotation until 0700 hours (unless otherwise agreed upon).

If overlapping or concurrent calls are received and all on-call Crime Scene Specialists are unavailable, it is the responsibility of the first call Crime Scene Specialist to notify the Duty Supervisor.

Crime Scene Specialists shall try to schedule time off, vacations and other leave when they are not on call. If training schedules, vacations or other situations (non-emergencies) develop which conflict with the on call schedule, the scheduled Crime Scene Specialist shall be responsible for finding another Crime Scene Specialist to cover the on call week, with approval from the Supervising Crime Scene Specialist. If changes are made, the Supervising Crime Scene Specialist shall distribute an updated on-call schedule.

Refer to Policy 6.1 in the Quality Assurance Manual for On-Call Policy and Procedures.  
Refer to Policy 6.2 in the Quality Assurance Manual for Crime Scene Management.

#### **4.0.1 TECHNICAL PRECAUTIONS WHEN RESPONDING TO A CRIME SCENE OR RELATED EVENT**

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##### **ANAB Section 7.8.3 / ISO/IEC 17025:2017(E) Sections 7.8.3**

Crime Scene Specialists shall safeguard evidence within a scene or related event by:

- Taking appropriate measures to avoid contamination, cross contamination or alteration of the evidence. **NOTE: Crime Scene Specialists shall not enter multiple crime scenes/events without changing their clothes and shoes OR without donning new coveralls and shoe liners.**
- Wearing appropriate personal protective equipment (PPE) when necessary.
- Identifying environmental conditions that may damage or destroy evidence, and prioritizing, documenting and collecting affected evidence. **NOTE: If concerns regarding environmental conditions exist, it shall be documented in the case notes and report.**

If physical evidence and/or photographed evidence at a scene or related event is altered from its original condition (i.e. diluted bloodstains due to rainfall or shoe impressions left behind by medics), it shall be documented in the case notes and report.

#### 4.1 DOCUMENTATION OF CRIME SCENES USING PHOTOGRAPHY

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The crime scene and evidence items shall be photographed using a series of photographs (overalls, locations and close-ups). Overall photographs shall be taken to document the scene *as is*, prior to anything being altered. Once overall photographs are complete, items of evidence shall be identified with placards and/or labels and location photographs shall be taken. After establishing location, close-up photographs shall be taken of the items of evidence. Close-up photographs shall include the identifier and a scale (if not included on the identifier). An arrow (indicator or handwritten) should be used to identify a notable direction. The directional arrow should be placed as follows:

- On a vertical surface (i.e. wall, door, table leg), the arrow shall point in the up direction.
- On horizontal surface (i.e. floor, table), the arrow shall point in the north direction.
- In a vehicle (not on a vertical surface), the arrow shall point towards the front of the vehicle.

**NOTE: If evidence is located on a vertical surface, tape measurers/pocket rods/rule tape shall be used to document the height and distance from a notable object (i.e. door frame, window, corner of the wall) in the photographs.**

When documenting a body located within the scene, location photographs and overall photographs of the body shall be taken. This shall be done prior to Medical Examiner personnel manipulating the body in any way. When the body is moved by Medical Examiner personnel, additional photographs shall be taken of areas not previously documented (newly exposed areas). When the body is removed from the scene, additional photographs shall be taken of the areas where the subject was located.

##### *Fingerprint Evidence / Blood Spatter Evidence*

When photographing visible or developed friction ridge impressions (i.e. bloody prints, greasy prints)/blood spatter evidence, the camera shall be set to TIFF (close-up only) and a close-up lens should be used. An identifier (commonly a letter label) and scale (if not visible on the identifier) shall be included in the photograph(s) of each impression/blood spatter. The direction (north, up, front, etc.) shall be indicated using an arrow (indicator) or by marking an arrow on the identifier. **NOTE: Overall photographs and location photographs shall be taken prior to taking close-up photographs of the impression(s)/blood spatter.**

If prints are lifted and collected in the field, photographs of the areas from which the prints were lifted and collected shall be documented. Location photographs shall be taken of these areas. Close-up photographs are not necessary. (Refer to Section 3.21 for proper procedures for lifting and collecting prints.)

##### *Shoe/Tire Impressions*

When photographing a shoe/tire impression, the camera shall be set to TIFF. An identifier (commonly letter placard) and L-shaped rulers shall be included in the photograph(s) of

each impression. The direction (north, up, front, etc.) shall be indicated using an arrow (indicator) or by marking an arrow on the identifier. The camera shall be mounted on a tripod. The lens (film plane) shall be parallel with the surface of the impression. The timer or a shutter release cable should be used to prevent any shaking when taking the photograph(s). For three dimensional impressions, the flash shall be obliquely positioned at various angles (approximately 15°, 30° and 45°) on each side of the impression (at least twelve photographs). Two dimensional impressions can also require the flash to be obliquely positioned at different angles to document all detail present. **NOTE: Overall photographs and location photographs shall be taken prior to taking close-up photographs of the impression(s).**

## REFERENCES

1. Fisher, Barry A.J. and David R. Fisher. *Techniques of Crime Scene Investigation*. Eighth Edition. 2012.
2. Gardner, Ross. *Practical Crime Scene Processing and Investigation*. Second Edition. 2012.
3. Robinson, Edward M. *Crime Scene Photography*. Third Edition. 2016.

#### 4.1.1 LUMINOL APPLICATION AND PHOTOGRAPHY

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Luminol is used in solution to detect the presence of latent bloodstains and is considered a presumptive test for blood. The test is based on the peroxidase-like activity of the hemoglobin molecule. Luminol reacts to the hemoglobin molecule when an oxidizer is applied. When luminol is applied to blood, a chemical reaction occurs resulting in the emission of light. This reaction is better known as chemiluminescence. Hemoglobin derivatives greatly enhance the chemiluminescence exhibited by luminol when it is oxidized in an alkaline solution.

Luminol is highly sensitive and has the ability to detect blood in dilutions up to 1 in 5,000,000. Due to this sensitivity, luminol is well suited for crime scene application, especially in cases where there is a suspicion of possible clean-up of blood. It can aid in the visualization of bloodstain patterns (i.e. drag marks and shoe impressions) that were partially visible or not visible at all to the naked eye.

#### **POLICY**

Luminol shall not be used as a substitute for careful visual examination for blood. The area(s) of interest should be searched in daylight or with ample light, prior to using luminol.

If luminol testing is requested, a Criminalist shall be called, unless otherwise directed, to assist in the application of luminol and interpret any patterns that develop.

#### **MATERIALS AND EQUIPMENT**

##### **Luminol Solution Preparation:**

- Luminol powder (3-aminophthalhydrazide).
- Sodium Perborate.
- Sodium Carbonate.
- Distilled or nanopure water.
- One 1L plastic bottle.
- One 50mL tube.
- Plastic spray bottle.

##### **Documentation:**

- Camera.
- Lens.
- Tripod.
- Shutter release cable (optional).

#### **CONTROLS**

Positive Control: Pieces of copper or copper penny.

Negative Control: Area void of any suspected bloodstains.

## **SAFETY CONCERNS**

Luminol can be harmful if inhaled, ingested, or absorbed by the skin, and can cause skin and/or eye irritation. The solution can be irritating to the mucous membranes and the upper respiratory tract.

## **SAFETY EQUIPMENT AND PROCEDURES**

The Crime Scene Specialist can wear the following:

- Lab coat.
- Gloves.
- Eye protection.
- Mask or respirator.

Luminol should be used in a well ventilated area when possible. The chemical powder should not be inhaled. In case of contact, immediately flush eyes with water for fifteen minutes and wash hands with soap and copious amounts of water.

## **PROCEDURE**

The following proportions of reagents should be carefully measured and used to produce 100mL of luminol solution:

- 0.1g luminol power
- 0.7g sodium perborate
- 5.0g sodium carbonate
- 100mL distilled or nanopure water.

Weigh out the appropriate amount of reagents and place them into a 50mL tube. If the reagents are not going to be used immediately, it is best to store the sodium perborate in a separate 50mL tube. The luminol powder and the sodium carbonate can be stored together. Once the reagents are mixed together, they have a shelf life of approximately 24 hours.

Measure the appropriate amount (100mL) of water and place it in a plastic bottle. Immediately prior to luminol application, the reagents need to be added to the water in the plastic bottle and thoroughly mixed. Once mixed, the luminol reagent shall be transferred into the plastic spray bottle. NOTE: Undissolved powder can clog the pump mechanism of the spray bottle.

Prior to the application of the luminol solution, the positive control shall be placed in the general vicinity of the area to be tested. Set up any camera equipment required for the documentation of the chemiluminescence at this point (see below).

Darken the area suspected of containing latent bloodstains to near or total darkness. It is advisable to allow time for eyes to adjust to the darkness.



The nozzle of the plastic spray bottle should be set to the finest mist setting. Lightly spray the area of interest, as well as the positive control. If applicable, lightly spray an area known to contain bloodstains, as well as a known negative area.

## **INTERPRETATION**

A strong chemiluminescence (positive reaction) should be exhibited by the control in the form of a chemiluminescent “bluish glow,” when it is sprayed with the luminol solution. This glow results from the control because the luminol solution is known to react with certain metal halides of copper and iron. The positive reaction from the control can be used as a quality control of the luminol solution.

A positive reaction in the area of interest is also identified by the presence of a chemiluminescent “glow,” which lasts several seconds before fading. Caution must be exercised in interpreting faint or weak reactions, as well as “flashes,” which could result from the interactions of luminol with metallic halides. Generally, “flashes” will fade to total darkness immediately after spraying, while a positive bloodstained area will exhibit a longer lasting continuous reaction.

The chemiluminescence exhibited from the oxidation of luminol by a bloodstained area is bluish-white in nature.

Positive reactions with the luminol solution should be judged on the color of the reaction, the intensity of the reaction and the duration of the reaction.

It is important to note that luminol will react to produce a false positive with any agent that can oxidize the chemical directly. Some cleaning agents (i.e. Drano and Pine-Sol), as well as metallic halides, can produce false positives with the luminol solution. A positive reaction obtained with the luminol solution, even a strong, long-lasting chemiluminescence, is not enough to confirm the presence of blood and should be further tested.

It should also be noted that luminol will not interfere with further presumptive testing, human origin through HemaTrace, or subsequent DNA testing.

## **PHOTOGRAPHY**

Prior to applying the luminol solution to the area(s) of interest, the camera equipment shall be set up. The camera shall be mounted on a tripod and shall be set to the RAW format. The timer or a shutter release cable should be used to prevent any shaking when taking the photograph(s). The positive control shall be placed in the vicinity of the area to be tested. Ensure the control is in the frame. Take a control photograph of the area, prior to the room being darkened and the luminol solution being applied. Without moving the camera or changing the focus or settings on the camera in any way, darken the room and take a photograph of the luminol reaction. The photograph of the luminol reaction can be taken using several different techniques, two of which are described below.

**NOTE:** If a flash is mounted on the camera, be sure to turn it off when taking the luminol reaction photograph.

### *Technique #1 (Bulb):*

Set the camera to the Manual mode, including manual focus, and the RAW format. After taking the control photograph, set the shutter speed to “Bulb.” Attach a shutter release cable to the camera, if not already attached. As the luminol is applied, begin taking the photograph by using the shutter release cable. Hold down the shutter release button until the chemiluminescent reaction is complete (no longer visible). Release the shutter release button and allow the camera to process the image. The initial photograph and the photograph of the luminol reaction should be overlaid immediately. Overlay the two images and save the new image. See below for the image overlay procedure.

### *Technique #2 (Aperture Priority):*

Set the camera to the Aperture Priority mode and the RAW format. Take the initial photograph. As the luminol is applied, take another photograph. The camera will determine the shutter speed required to take the photograph. Once the photograph is taken, allow the camera to process the image. The initial photograph and the photograph of the luminol reaction should be overlaid immediately. Overlay the two images and save the new image. See below for the image overlay procedure.

NOTE: Regardless of the technique used to document the luminol reaction, the photograph should be examined prior to overlaying the images. Be sure that the reaction, if any, is visible. If the reaction is not visible, adjust the settings on the camera and retake the photograph.

### *Image Overlay Procedure*

After taking the control photograph and the luminol reaction photograph, open the menu settings on the camera, select the “Retouch Menu,” and then select “Image Overlay.” The camera will prompt you to select “Image 1” (control photograph) and “Image 2” (luminol reaction photograph). In “Preview Area,” select “Overlay” then “Save” (click “OK”). The camera will take a few seconds to process the overlaid image and then save new image. Ensure the new image was created and saved, and that the reaction is visible.

NOTE: To overlay images, the images must be taken in RAW. If the images are not taken in the RAW format, when “Image Overlay” is selected, the camera will display a message stating that there are no images available for overlay. The overlay of images can be done at a later time, but should be done immediately. If done later, the overlaid image will appear after the last image taken.

## **COLLECTION**

General evidence collection guidelines should be used for the collection of luminol positive areas. If a luminol positive stain is going to be collected using a swab, a sponge-tipped swab provided specifically for the collection of luminol positive stains should be used. Refer to Section 3.22 for proper procedures for collecting swabs of possible DNA evidence.

NOTE: When luminol is used in the field, the areas processed with luminol shall be documented in the case notes.

## REFERENCES

1. Fisher, Barry A.J. and David R. Fisher. *Techniques of Crime Scene Investigation*. Eighth Edition. 2012.
2. Gardner, Ross. *Practical Crime Scene Processing and Investigation*. Second Edition. 2012.
3. Houck, Max M. and Jay A. Siegel. *Fundamentals of Forensic Science*. Third Edition. 2015.
4. Robinson, Edward M. *Crime Scene Photography*. Third Edition. 2016.
5. National Institute of Justice. *Sourcebook in Forensic Serology, Immunology and Biochemistry*. 1980.

#### **4.1.2 DIGITAL PHOTOGRAPHY AND STORAGE**

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Digital photographs shall be taken at the best practical compression quality, to be determined by the intended use of the images. Photographs shall be taken in JPEG fine format, unless photographing patterns for comparison (TIFF) or overlaying images (RAW). Images shall *not* be deleted from the memory card, unless formatting the memory card. Memory cards should not be formatted until the digital images have been successfully transferred to a computer.

For each case, the digital images shall be transferred from the memory card to a computer. The number of images transferred shall be verified and documented in the Crime Scene Specialist's notes, including the date the images were transferred.

#### **DISCS AND STORAGE**

A "Master" DVD and a "Working Copy" DVD containing all photographs taken shall be made and individually sealed and barcoded. This may require multiple discs to be made (depending on the number of photographs taken). Additional copies of the "Working Copy" DVD(s) can be made for the Detective assigned to the case. The discs shall be labeled with the following information:

- Incident Number and Case Number (if applicable).
- Investigative Unit.
- Victim's Name and Suspect's Name (if known).
- "Master" or "Working Copy."
- Crime Scene Specialist's initials and ID number.
- Charge.
- Event (i.e. Scene, Suspect processing).
- Images contained on the disc.
- Date of the first photograph of the first event on the disc.

"Working Copy" photographs of a scene/event and "Master" note page photographs shall be stored on the G-Drive. "Working Copy" photographs of note page photographs related to a scene/event worked by the Crime Scene Specialist can be stored on the G-Drive (instead of the "Master" photographs). They shall be uploaded to the "Lab Images" folder, under the year the case took place. Clerical personnel shall move the uploaded folders to the "Case File" folder.

Photographs taken as part of a Homicide investigation shall be uploaded to the V-Drive under the year the case took place. The photographs should be uploaded under the case number and Homicide Team working the case (i.e. 19-000000\_Tm 1). If "Master" images are uploaded to the V-Drive, the Crime Scene Specialist shall notify the Detective that copies shall not be made of these images. The "Master" images shall be replaced with "Working" images as soon as possible.

## 4.2 COLLECTING EVIDENCE FROM CRIME SCENES AND RELATED EVENTS

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### ANAB Section 7.4.1.1 / ISO/IEC 17025:2017(E) Sections 7.4.1

The decision of what evidence should be collected should be a joint effort between the Crime Scene Specialist, the Detective(s), and Criminalist (if present). The proper collection and handling of evidence is the responsibility of the Crime Scene Specialist.

When collecting items of evidence, gloves shall be worn at all times. A new pair of gloves shall be donned for each item of evidence handled. If at any time the Crime Scene Specialist touches anything other than the item of evidence, a new pair of gloves shall be donned.

In the interest of personnel safety, prior to the collection of evidence the Crime Scene Specialist shall examine all containers (backpacks, duffle bags, etc.) for the presence of hazardous materials, chemicals and/or explosives. If a hazard is identified, the Crime Scene Specialist shall notify the Detective, Sergeant, etc. for the proper procedures moving forward.

When collecting evidence, the packaging shall be labeled in the field with the following information (*at the least*):

- Identifier (placard, label, etc.), if applicable.
- Brief description of the item.
- Location from where the item was collected.
- Date and time of collection.
- Crime Scene Specialist's initials and ID number.

#### *Latent Print Evidence*

If prints are lifted and collected in the field, the latent print cards shall be filled out as completely as possible in the field. When a print is lifted and collected, an identifier shall be placed on the area from which the lift(s) was collected. The identifier shall be labeled with a number corresponding to the card number (on the latent print card) of the lift collected from that area. After print processing is complete and identifiers have been placed, photographs shall be taken to document the areas from which prints were lifted and collected. The areas that were processed for prints and the methods used shall be documented in the notes, along with any results yielded. **NOTE: If the areas being processed for latent prints will be swabbed for possible DNA evidence and cross contamination is a concern, separate powders and brushes shall be used.**

#### *DNA Evidence*

Areas should be swabbed for possible DNA evidence as soon as possible (after overall photographs are taken and after latent print processing, if applicable), to eliminate the chance of cross contamination. Refer to Section 3.22 of the manual for proper procedures for swabbing.

Identifiers (placards, labels, etc.) do not have to be used to mark areas that are swabbed for possible DNA evidence. If an area is swabbed after latent print processing, it shall be noted on the packaging.

#### 4.2.1 COLLECTION AND PROCESSING OF FIREARMS

##### ANAB Section 7.4.1.1 / ISO/IEC 17025:2017(E) Sections 7.4.1

**Always use caution when handling a firearm.**

#### *Collection*

The Crime Scene Specialist shall be responsible for all photographic documentation of the condition of the firearm upon collection. Both sides of the firearm shall be photographed in the field with the identifier in the frame (if applicable). Do not turn the firearm over on a surface that is not clean. For handguns, cut open a brown paper bag and lay it (exterior side down) in a handgun box. Open the bag and place the firearm (on the original interior surface of the bag) in the handgun box. For long guns, cut a piece of clean butcher paper, or cut open multiple bags, and lay it in a rifle box. Place the long gun in the rifle box. The firearm should not come in contact with the interior surfaces of the handgun/rifle box. If gun boxes are not available, carefully package the firearm in a bag. If packaged in a bag, when back in the laboratory the firearm shall be packaged in a gun box with the original packaging.

When collecting a firearm, it should be collected in its original condition. An arrow shall be placed on the packaging in the same direction as the barrel of the firearm. If the firearm is loaded, it should be noted on the packaging. The firearm should be transported in a safe manner. When back in the laboratory, the firearm shall be placed in the firearm cabinet if it is loaded or requires Firearms examination. If the firearm requires examination from the Firearms Unit, a Chain of Custody shall be filled out and placed with the firearm in the firearm cabinet. A copy of the Chain of Custody form shall be placed in the Firearms Unit's supervisor's mailbox.

Firearms shall be rendered safe by a Firearms Criminalist. This shall be documented in the notes and signed by the assisting Firearms Criminalist. A revolver cylinder should be marked to show position prior to being unloaded.

#### *Firearms submerged in Water*

Firearms in water should never been exposed to air and should remain in water until a final determination of processing required is made. A plastic container with a lid is needed for collection of firearms in water. The container should be filled with the same water in which the firearm is located. If the water is deep enough, the container should be placed directly in the water. If there is not enough of the same water available, fill the container with like water, if available. Without removing the firearm from the water (if possible), place it in the container (filled with water). A firearm box should be made, labeled with all the proper documentation for collection, and kept with the firearm. The container shall be transported back to the laboratory and placed in the firearm cabinet. The firearm shall remain in water until further processing is determined or directed to impound the firearm. The water shall be discarded and the firearm shall be packaged in the firearm box labeled with the proper information.

#### *Processing*

All firearms collected by a Crime Scene Specialist shall be processed for prints and possible DNA evidence, unless otherwise notified. If directed not to process a firearm, written authorization is required from the Sergeant in charge of the investigation. Officer's firearms do not need to be processed for prints and possible DNA evidence, unless otherwise notified.

#### 4.2.2 COLLECTION OF IMPRESSION EVIDENCE (CASTING AND LIFTS)

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##### ANAB Section 7.4.1.1 / ISO/IEC 17025:2017(E) Sections 7.4.1

Impressions in the forensic science field refer to both three-dimensional depressions and two-dimensional marks. The most common types of impression evidence include shoeprints and tire tracks. These impressions can be collected as evidence using a number of different methods. Casting using dental stone is the most common method used for collecting three-dimensional impressions. Two-dimensional impressions are commonly collected using one of many lifting methods, which include gel lifts, tape lifts, and the use of an Electrostatic Dust Print Lifter. (Refer to Section 4.2.3 for proper procedures for using an Electrostatic Dust Print Lifter).

NOTE: Prior to attempting to cast or lift an impression, the impression shall be photographed and properly documented in place (if possible). Refer to Section 4.1 for proper documentation procedures for impression evidence.

##### *Casting*

To cast an impression, dental stone shall be used. In a container/bag, pour an appropriate amount of dental stone for the size of the impression. Add water to the dental stone and mix thoroughly. The mixture should have the consistency of pancake batter. Do not allow the dental stone to sit after mixing as it will begin to harden. Pour the mixture to the side of the impression, allowing the dental stone to flow into the impression. Do **not** pour the mixture directly into the impression, as this could cause a loss of detail and damage the impression. NOTE: Large debris on top of the impression can be removed prior to casting, after initial photographs are taken. It may be necessary to place a frame around the impression or use soil/materials to build walls around the impression to contain the dental stone.

Once the casting has dried, it shall be labeled with the Crime Scene Specialist's initials and ID number, the north direction, and the identifier (placard) number/letter. The casting shall be lifted out of the ground and packaged in a cardboard box. The soil/debris shall not be cleaned/removed from the casting. When back in the laboratory, allow the casting to air dry for **at least** 48 hours prior to sealing the packaging and impounding.

NOTE: A thin layer of hairspray may be used to reinforce the impression prior to casting. Do **not** spray the hairspray directly onto impression. Instead, spray the hairspray above the impression and allow it to settle over the impression.

##### *Gel Lifts*

To lift an impression using a gel lift, first identify what kind of gel lift is best suited for the impression. Gel lifts come in white and black. It is important to use a gel lift with a background color that will provide contrast with the impression (i.e. an impression composed of dust should be lifted with a black gel lift, as it would be difficult to visualize the impression on a white background). After determining the gel lift best suited for the impression, peel back the clear plastic cover (**do not discard**) and allow the gel lift to rest. Lay the gel lift (sticky-side down) over the impression. Use a roller or something with a flat



edge to push the air bubbles out. Label the back of the lift with the north direction. Allow the gel lift to sit for several minutes. Lift the gel lift and allow it to rest again. Observe with oblique lighting (if necessary). Use caution when lifting the gel lift. It is important not to stretch the gel lift. This can change the dimensions and/or details of the impression.

The impression should be photographed immediately after lifting when possible. Refer to Section 4.1 for proper documentation procedures for impression evidence. After documenting the impression, lay the original clear plastic cover over the impression and package. If collecting multiple gel lifts that will be packaged together, individually package each gel lift within the outer packaging. If it is not possible to document the impression on the gel lift in the field, tape the gel lift down inside of a cardboard box and transport back to the laboratory for documentation. Try to avoid placing the clear plastic cover back over the impression prior to photographing the impression.

#### *Tape Lifts (Not trace lifts)*

Using a tape lift to collect impression evidence is similar to the method used when using a tape lift to collect latent print evidence. Carefully lay tape over the impression, trying to avoid creating air bubbles. If necessary, overlap the tape in a manner that will not disrupt visualizing any details. Lift the tape and lay it on a latent print card. The latent print card(s) shall be filled out as completely as possible in the field.

If using a tape lifter (tape and backing pre-packaged together), peel back the backing (*do not discard*) and lay the tape over the impression. After lifting, adhere the tape to the original backing. The lifter shall be labeled with the Crime Scene Specialist's initials and ID number, the north direction, and the identifier (placard) number/letter.

#### **NOTES**

Two-dimensional impressions can be enhanced/developed with powder. However, prior to applying powder to the impression, be sure that doing so will not destroy the impression (i.e. a dust print will be wiped away with the brush if powdered). If possible, document (with photography) the impression prior to enhancing it in any way. Refer to Section 4.1 for proper documentation procedures for impression evidence.

When possible, an impression should be lifted using one of the aforementioned techniques, even if photography was utilized to document the impression.

#### **REFERENCES**

1. Fisher, Barry A.J. and David R. Fisher. *Techniques of Crime Scene Investigation*. Eighth Edition. 2012
2. Gardner, Ross. *Practical Crime Scene Processing and Investigation*. Second Edition. 2012.

#### **4.2.3 COLLECTION OF IMPRESSION EVIDENCE USING AN ELECTROSTATIC DUST PRINT LIFTER**

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##### **ANAB Section 7.4.1.1 / ISO/IEC 17025:2017(E) Sections 7.4.1**

An Electrostatic Dust Print Lifter is an instrument used to lift prints in dust. This instrument operates by using a Mylar-like film and an electrical charge to transfer the print from the surface it is deposited on to the Mylar-like film. Electrostatic Dust Print Lifters can be used on a number of different surfaces including floors, doors, paper and clothing.

#### **PROCEDURE**

Prior to using the Electrostatic Dust Print Lifter on evidence, a control shall be tested. Apply dirt or dust to a shoe and touch it to a surface similar to the area the Electrostatic Dust Print Lifter will be used to collect evidence, if possible. Lift the control impression using the procedure below. If the impression lifts, the control is positive. Document in the case notes that a control was tested, along with the result.

After locating and identifying an impression in dust to be lifted, cut a piece of the Mylar-like film and place it (black side down) over the print. Plug the ground lead into the Power Unit. This will either be an alligator clip or a telescoping wand, depending on which unit is being used. Place the telescoping wand approximately 1" away from the edge of the film. If the print is being lifted from paper or fabric, use the ground plate and alligator clip. NOTE: If using the small portable Electrostatic Dust Print Lifter (Path Finder), there is no ground lead or probe. The Power Unit uses the metal notches on the bottom of it and a metal plate to conduct the electricity. The metal plate is placed under the end of the Power Unit with two metal notches and the front of the Power Unit with one metal notch is placed on the Mylar-like film.

When the instrument is set up, turn the "voltage-adjust" knob on the Power Unit to the low setting and turn it on. A red light should be visible when the unit is turned on. Touch and hold the probe to the film until the film lays flat. The voltage can be increased, if needed. Use the roller to remove any air bubbles from the film. Turn off the Power Unit and allow time for the charge to dissipate. Lift the film and examine with oblique lighting. The impression should be photographed immediately after lifting when possible. Refer to Section 4.1 for proper documentation procedures for impression evidence. After documenting the impression, tape the piece of film down inside of a cardboard box for transport and packaging. If it is not possible to document the impression on the film in the field, transport back to the laboratory and photograph prior to sealing the packaging and impounding.

#### **REFERENCES**

1. Fisher, Barry A.J. and David R. Fisher. *Techniques of Crime Scene Investigation*. Eighth Edition. 2012
2. Gardner, Ross. *Practical Crime Scene Processing and Investigation*. Second Edition. 2012.

#### **4.2.4 USING METAL DETECTORS TO LOCATE EVIDENCE**

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Metal detectors are used to locate hidden/buried metal items that can be important evidence. These items can be easily missed or overlooked without the use of metal detectors.

##### **EQUIPMENT**

- Metal Detector #1: Garrett CSI 250 with serial number "52164403."
- Metal Detector #2: Garrett CSI 250 with serial number "52164408."

##### **PROCEDURE**

When a metal detector is taken into the field, the Equipment Sign-Out Log shall be filled out. The following information shall be logged:

- The assigned number of the metal detector taken.
- Name and ID number.
- Date of sign-out.
- Date returned.

Prior to using the metal detectors to locate evidence, a control shall be tested. A binder clip is included in each of the metal detector binders and should be used to test the metal detector. Turn on the metal detector and run it over the binder clip. A beeping sound should be heard as the metal detector is moved over the clip. If the beeping sound is present, the control is positive. If the metal detector does not turn on or there is no beeping sound during the control test, change the battery and attempt the control test again. Document in the notes that a control was tested, along with the result. After the control is tested, move the metal detector over the area being searched. The sensitivity of the metal detector can be adjusted if necessary.

The following information shall be documented in the case notes when using a metal detector:

- Number of metal detector used (#1 or #2).
- Control was tested and the result.
- The area that was searched using the metal detector.

NOTE: If other personnel use the metal detector(s), notes are not required.

Refer to the Operation Manual for the metal detectors if additional information/instruction is needed.

#### 4.2.5 COLLECTION OF INSECTS

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##### ANAB Section 7.4.1.1 / ISO/IEC 17025:2017(E) Sections 7.4.1

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The San Diego Police Department's entomology contact is Dr. David Faulkner. His general work phone number is (619) 894-0260. Dr. Faulkner is available to answer questions or to provide assistance with insect collection.

The following are general guidelines and considerations for processing crime scenes that include insect collection.

Initial Contact Information that should be noted:

- The date and hour of the discovery of the body.
- The date and hour the decedent was last seen alive.
- The presumed manner of death.
- The condition of the scene (habitat).
- The degree of degradation of the body.

Equipment needed:

- Hand net.
- Forceps.
- Digging tools.
- Thermometer.
- Vials, jars and plastic bags.

#### *Collection*

**Flies:** Maggots concentrate in the head and open wounds of the deceased. After locating a maggot mass, measure and note the temperature of the air and the maggot mass. Collect and preserve the maggot samples in 70% ethyl or isopropyl alcohol. Keep approximately two dozen maggots alive in a cooler on ice, but do *not* freeze.

Maggots crawl away from the body to pupate. Look under objects from three to ten meters away from the body to locate puparia. A puparium is seed-like, about 1/2 centimeter long, and red to dark brown in color. Collect approximately two dozen puparia and keep them alive in a cooler on ice, but do *not* freeze.

Collect flying insects over the body with a hand net or sticky traps. Kill and preserve any adult flies in 70% ethyl or isopropyl alcohol.

Make sure to look for insects in the folds of the clothing, both at the scene and the autopsy. Collected three to four soil samples from underneath the body, if located outside. Refrigerate these samples, do *not* freeze. Soil samples need to be collected from 10 centimeters deep and can be stored in re-sealable plastic bags.

**Beetles:** Look for and collect larger beetles from underneath the body if present.

**Labeling:** Include the date and time of collection, and the location from which the specimen was collected on the specimen label.

## REFERENCE

1. Haskell, Neal and Ralph E. Williams. *Entomology and Death – A Procedural Guide*. 1990

#### 4.3 PROCESSING SUBJECTS AT THE MEDICAL EXAMINER'S OFFICE (AUTOPSY)

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The Crime Scene Specialist is responsible for bringing personal protective equipment to an autopsy. Proper PPE consists of the following:

- Lab coats.
- Masks.
- Shoe covers.
- Eye Protection.
- Gloves.

The Crime Scene Specialist shall provide personal protective equipment, excluding eye protection, for every San Diego Police Department representative attending the autopsy. This shall be documented in the sign-in book at the Medical Examiner's Office by writing "Brought Own PPE" under the correct case. This prevents the department from being charged for personal protective equipment.

##### *Photography*

The following photographs should be taken during an autopsy:

- Right and left side of the sealed body bag, including the Medical Examiner's red lock and name tag.
- Right and left side of the subject prior to head, hands and feet bags being removed.
- Segmented photographs of each side of the subject in a clothed and unwashed, an unclothed and unwashed condition, and an unclothed and washed condition.
- All sides of the subject's hands (unwashed and washed).
- Clothing (if applicable).
- Injuries (unwashed and washed).
- Tattoos, scars and any additional pertinent marks.

NOTE: It is important to communicate with the detective as to what photographs are needed. Some photographs may not be needed or additional photographs may be required.

When photographing injuries, tattoos and/or scars, a location photograph and a close-up photograph shall be taken of each identifying mark with a scale in the frame. If a pattern is present (i.e. stippling), the photographs shall be taken in TIFF format with a scale in the frame.

##### *Evidence Collection*

The following items of evidence should be collected during an autopsy:

- Head, hands and feet bags (packaged separately).
- Gunshot Residue Collection Kit (for firearm related crimes).
- Hand swabs (palm side and back side for each hand).
- Fingernail scrapings from each hand (packaged separately).
- Plucked head hair (collected from at least five different areas - approximately 50 to 100 hairs total).

- Reference mouth swabs.
- Clothing.

NOTE: It is important to communicate with the detective as to what evidence is needed. Some items of evidence may not be needed or additional items of evidence may be required.

The following items of evidence should be received from the Forensic Autopsy Specialist during an autopsy:

- Set of inked finger and palm prints.
- Projectiles/objects removed from the subject (if applicable).

NOTE: A piece of bone (rib/femur) should be requested and received from the Forensic Autopsy Specialist. If the body is severely burned or decomposed, a piece of the femur should be requested and received from the Forensic Autopsy Specialist.

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#### 4.4 PROCESSING LIVE SUBJECTS

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Live subjects are generally processed in the Crime Scene Unit Studio. Prior to the arrival of the subject, the Crime Scene Specialist shall set up the processing room. The desk shall be cleaned with bleach and a clean piece of butcher paper shall be placed on top of the desk. Anything that could be used as a weapon shall be cleared off the desk, chairs, and floor.

No processing shall be done without the presence of sworn personnel.

#### **SUBJECT PROCESSING**

##### *Photography*

The following photographs should be taken during a subject processing:

- Segmented photographs of each side of the subject (full length, waist up, head).
- Front and back of the subject's hands.
- Subject in front of the height chart, including a close-up.
- Subject on the scale, including the resulting digital readout.
- Injuries, tattoos, scars and any additional pertinent marks.

NOTE: It is important to communicate with the detective as to what photographs are needed. Some photographs may not be needed or additional photographs may be required.

When photographing injuries, tattoos and/or scars, a location photograph and a close-up photograph shall be taken of each identifying mark with a scale in the frame. If a pattern is present (i.e. bloodstains), the photographs shall be taken in TIFF with a scale in the frame.

##### *Evidence Collection*

The following items of evidence should be collected during a subject processing:

- Reference mouth swabs (following department procedures).
- Fingernail scrapings from each hand (packaged separately).
- Plucked head hair (collected from at least five different areas - approximately 50 to 100 hairs total).
- Clothing. NOTE: If subject is wearing multiple layers, it may be necessary to photograph the subject after each layer of clothing is removed.
- Gunshot Residue Collection Kit (for firearm related crimes).
- Hand swabs (palm side and back side for each hand).

NOTE: It is important to communicate with the detective as to what evidence is needed. Some items of evidence may not be needed or additional items of evidence may be required.

Detectives are generally responsible for the collection of the following:

- Blood sample.
- Urine sample.
- Breath test.
- Inked prints.
- Handwriting exemplar.



Subjects involved in sexual assault cases may be processed by medical personnel. However, photographs and/or additional items of evidence may be necessary and may be processed by a Crime Scene Specialist. NOTE: SART kits are collected by medical personnel.

## **OFFICER PROCESSING**

The following photographs should be taken during an officer processing:

- Segmented photographs of each side of the officer (full length, waist up, head).
- Front and back of the officer's hands.
- Officer's duty belt and uniform.
- Damage to the officer's uniform and/or duty equipment.
- Injuries.
- Officer in front of the height chart, including a close-up.
- Officer on the scale, including the resulting digital readout.

NOTE: It is important to communicate with the detective as to what photographs are needed. Some photographs may not be needed or additional photographs may be required.

When photographing injuries, a location photograph and close-up photograph shall be taken of each injury with a scale in frame.

### *Evidence Collection*

The following items of evidence should be collected/received during an officer processing:

- Officer's firearm and magazines (if involved in an officer-involved shooting).
- Swabs of any blood that may have been transferred onto the officer's body or clothing.
- Swabs of areas where a subject may have touched (i.e. holster).
- Hand swabs (palm side and back side for each hand).

NOTE: It is important to communicate with the detective as to what evidence is needed. Some items of evidence may not be needed or additional items of evidence may be required.

An officer's firearm and magazine(s) (if involved in an officer-involved shooting) should not be rendered safe or altered by the officer upon collection. The gun box containing the firearm and magazine(s) shall be placed in the firearm cabinet in the Crime Scene Unit, along with a Chain of Custody Form filled out with the relevant information. A copy of the Chain of Custody Form shall be placed in the Firearms Unit's supervisor's mailbox for Firearms examination. The firearm shall be returned to the firearm cabinet in the Crime Scene Unit at the completion of analysis. Once returned, release of the officer's equipment should be arranged with a Sergeant or above.

NOTE: Officers' equipment should not be barcoded and impounded, unless otherwise directed.

## 4.5 PROCESSING VEHICLES

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Vehicles may be processed as part of a crime scene worked by a Crime Scene Specialist or may be assigned to a Crime Scene Specialist upon receiving a vehicle work request. Vehicle work requests can be submitted by Detectives and come through the laboratory in the same manner as evidence processing requests (refer to Section 2.0). When a vehicle work request is received, it shall be assigned to the third call Crime Scene Specialist for that week, unless otherwise agreed upon. If a vehicle processing is done in connection to a case worked by a Crime Scene Specialist, a vehicle processing request shall not be required.

When a Crime Scene Specialist receives a vehicle processing request, they shall contact the requesting detective to discuss the case, what methods of processing are necessary/wanted and arrange a time for the vehicle to be processed. If a search warrant is required, the Detective shall be present at the start of the vehicle processing. Detectives should be present when processing vehicles, but are not required to be unless a search warrant was obtained. If a Criminalist is needed, the Crime Scene Specialist shall contact the Forensic Biology Supervisor. A Criminalist shall be assigned to the case by the supervisor. The Criminalists on call should not be utilized for vehicle processing(s), unless otherwise directed.

If a vehicle is processed at the Northwestern Division Impound Facility, it should be removed from the bay immediately after processing. If the vehicle needs to be transferred to another location, it shall be arranged by the Detective.

### *Photography*

The following photographs should be taken during a vehicle processing:

- Overalls of the exterior of the vehicle.
- Photographs of the Vehicle Identification Number.
- Overalls of the interior of the vehicle.
- Overalls of the trunk/cargo compartment.
- Overalls of the engine compartment.
- Photographs of the fuel compartment.
- Photographs of damage to the vehicle.

NOTE: It is important to communicate with the detective as to what photographs are needed. Some photographs may not be needed or additional photographs may be required.

### *Evidence Collection*

The following items of evidence should be collected during a vehicle processing:

- Swabs of possible DNA evidence from the exterior and interior of the vehicle. Refer to Section 3.22 for proper procedures for collection DNA evidence.
- Any latent print evidence. Refer to Sections 3.4 and 3.21 for proper procedures for processing for latent prints using powder and lifting developed prints.
- Trace evidence, including paint samples. Refer to Section 3.23 for proper procedures for collecting trace evidence.

NOTE: It is important to communicate with the detective as to what evidence is needed/wanted. Some items of evidence may not be needed or additional items of evidence may be required.

#### **4.6 HANDLING EVIDENCE COLLECTED FROM CRIME SCENES AND RELATED EVENTS**

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##### **ANAB Section 7.4.1.1 / ISO/IEC 17025:2017(E) Sections 7.4.1**

Evidence shall be kept in a closed or covered condition when not being worked on. The outer packaging (boxes, envelopes, etc.) used to transport and contain collected evidence shall not be sealed.

Proper PPE shall be worn when handling evidence. If the gloves currently being worn come in contact with something other than the item being examined, a new pair of gloves shall be donned prior to handling the item of evidence.

Prior to physically working on evidence, the laboratory bench being used shall be cleaned with bleach and then covered with butcher paper. An additional piece of clean butcher paper shall be used for each item of evidence being examined/processed. When work is completed, the laboratory bench shall be cleaned with bleach.

If evidence needs to be dried, drying hoods should be utilized. The drying hoods shall be cleaned with bleach before and after use. Clean butcher paper shall be used in the hoods. Butcher paper shall be used to cover the wooden dowels (if applicable) to prevent contamination. A biohazard bag shall be placed over the hose (if applicable). Hangers (if used) shall be cleaned with bleach prior to use. Used hangers shall be disposed of in the white Biohazard bin in the Evidence Inventory Room. Hoods shall remain on when evidence is being dried. Once the evidence is dry, the evidence shall be removed from the hood(s) and placed in the original packaging. **Evidence from multiple cases shall not be placed in the same hood.**

When using a drying hood, the Crime Scene Specialist shall complete the "Hood Cleaning Log." The following information is required:

- Date evidence was placed in the hood/cabinet.
- Hood number.
- Crime Scene Specialist's name and ID number.
- At least one of the following:
  - Case number.
  - Incident number.
  - Victim's name.
  - Suspect's name.

If all of the drying hoods are being used, evidence should be dried in the stink tank. The Crime Scene Specialist shall notify the Supervising Crime Scene Specialist of the lack of space in the hoods as soon as possible.

Perishable evidence shall be placed in the refrigerator or freezer (depending on the type of evidence).

#### **4.7 RECEIVING AND RELEASING EVIDENCE COLLECTED FROM CRIME SCENES AND RELATED EVENTS**

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##### **ANAB Section 7.4.1.1 / ISO/IEC 17025:2017(E) Sections 7.4.1**

A Laboratory Chain of Custody Form (PD-482) shall be completed when evidence is received and/or released by the Crime Scene Specialist outside of the Property Room/Narcotics Vault procedures. These forms are not required for transfers of evidence in the field. The original Chain of Custody form shall be placed with the case packet and retained in the laboratory files.

When receiving evidence, the Crime Scene Specialist shall write the following information on the packaging of each item received:

- From who the item was received.
- Where the item was received.
- Date and time the item was received.
- Crime Scene Specialist's initials and ID number.

The Crime Scene Specialist shall also ensure that the following information is written, by the releasing individual, on the packaging of each item received:

- Brief description of the item.
- Location the item was collected from.
- Date and time the item was collected.
- Releasing individual's name and ID number.

When releasing evidence, the Crime Scene Specialist will retain proper documentation (who, what, when, where collected) of each item of evidence released. Items of evidence can be released prior to inventorying if necessary. These items shall be accounted for in the Crime Scene Unit Report.

All received and released items shall be accounted for in the Crime Scene Unit Report.

#### **4.8 INVENTORYING AND BARCODING EVIDENCE COLLECTED FROM CRIME SCENES AND RELATED EVENTS**

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##### **ANAB Section 7.4.1.1 / ISO/IEC 17025:2017(E) Sections 7.4.1**

Each item of evidence collected and/or received shall be examined in the Crime Scene Unit when possible. Each item shall be inventoried by providing a detailed description of the item. The description of the item shall include the condition it is in (i.e. soiled, saturated in blood, torn). Items of evidence shall be properly documented prior to being impounded in the Property Room/Narcotics Vault.

After inventorying an item, a barcode shall be generated and the packaging shall be completely labeled. Refer to Section 2.4 for the minimum information required to be inputted in the barcode system. NOTE: Items collected in the field shall be referenced as Evidence under Category in the barcode system.

All evidence packaging, tags, and/or containers shall be labeled with the following information:

- Identifier (placard, label, etc.), if applicable.
- Full item description.
- Location collected.
- Date and time collected.
- CSS's initials and ID number.
- Event and location (i.e. Scene - 1401 Broadway).
- Incident number and case number.\*
- Victim's and/or suspect's name.\*
- Investigative Unit assigned to the case.\*
- Barcode label.
- Barcode.

\*NOTE: If the required information is printed on the barcode label, it does not need to be handwritten on the packaging.

Evidence packaging/containers that have biological material on them or have been damaged shall be repackaged. If an item of evidence is repackaged, the original packaging shall be kept with the evidence. The new packaging shall be labeled with the following information:

- Information written by the Crime Scene Specialist on the original packaging.
- The word "Repack."
- The Crime Scene Specialist's initials and ID number.
- Date of repackaging.

All evidence (except money) shall be sealed prior to impound. Evidence tape shall be used to seal evidence. The Crime Scene Specialist's initials, ID number and date shall be written across the tape and packaging.

**Mouth swabs:** Mouth swabs shall be packaged in a large Reference Mouth Swab envelope. The envelope shall be marked with the subject's date of birth. The envelope does not get placed into a Freezer Packet.

**Blood vials:** Blood vials shall be stored in a plastic tube. The Crime Scene Specialist shall write their initials, ID number, date and time received and who they received it from on the blood vial at the time of collection. After a barcode is generated, a "Blood Label" shall be printed and attached to the outside of the plastic tube. The Crime Scene Specialist shall write their initials and ID number on the barcode label. The blood vial shall be placed in the plastic tube, capped, and sealed with clear evidence tape. All blood vials shall be impounded in the Narcotics Vault.

**Clothing:** Clothing should be wrapped in the butcher paper it was inventoried on and labeled with what the item is. This is done to preserve any trace evidence that may have fallen onto the paper during the inventory process.

**Money:** United States currency shall be packaged in a money envelope (if exceeding twenty dollars) and the denominations shall be noted. If money is found within another item (i.e. pants, wallet, backpack, etc.) and exceeds twenty dollars, it shall be removed from the item, packaged in a money envelope and barcoded separately. Money exceeding twenty dollars requires a witness to verify the dollar amount. The witness shall sign the money envelope after verification. The money envelope shall not be sealed until Property personnel verifies the dollar amount at the time of impound. The Property personnel shall sign the money envelope after verification.

**Narcotics:** If narcotics of any kind (prescription, illegal, etc.) are found within another item (i.e. pants, wallet, backpack, etc.), it shall be removed from the item and packaged and barcoded separately. All narcotics shall be impounded in the Narcotics Vault.

**NOTE:** If an item of evidence is separated from another item, it shall be cross referenced on both the packaging for the original item of evidence and the packaging for the separated item.

### *Drying Hoods*

When evidence is placed in a drying hood, the bottom of the hood is lined with clean butcher paper. Debris may fall onto the butcher paper during the drying process. If debris is observed, the butcher paper shall be folded into itself to contain any evidence. If there is a single item of evidence being dried in the hood, the butcher paper shall be labeled and included in the packaging with that item or used to wrap the item. If multiple items of evidence are being dried and the butcher paper cannot be associated with a single item of evidence, it will be placed in a bag or envelope, given a separate barcode and described as trace evidence collected from the bottom of the drying hood (document the hood number that contained the items of evidence).

#### **4.9 IMPOUNDING EVIDENCE COLLECTED FROM CRIME SCENES AND RELATED EVENTS**

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##### **ANAB Section 7.4.1.1 / ISO/IEC 17025:2017(E) Sections 7.4.1**

Scene related evidence shall not be kept in the Crime Scene Unit for longer than forty-five days. Evidence can be held in the Crime Scene Unit for longer than forty-five with approval from the supervisor.

Scene related evidence shall not be kept in the stink tank for longer than forty-five days. Evidence can be held in the stink tank for longer than forty-five with approval from the supervisor.

Small, individually packaged, evidence items containing possible DNA (such as blood swabs, DNA swabs, cigarette butts, hair, fingernail scrapings, etc.) shall be placed in a freezer packet labeled with the case information. The freezer packet may be temporarily stored in the Crime Scene Unit freezer until the time of impound. Items inside of the freezer packet shall be individually labeled and sealed. The outer freezer packet shall not get sealed. The packet containing the evidence shall be taken to the Property Room for freezer storage.

Evidence items that may decompose at room temperature (food, diapers, etc.) should be stored in the Property Room refrigerator, until a final determination as to what will be done with the evidence is made.

All Latent Print related evidence will be barcoded and impounded in the Property Room.

All narcotic related evidence (drugs, including over the counter and prescription drugs, drug paraphernalia, etc.) will be barcoded and impounded in the Narcotics Vault.



## 5.0 NOTE TAKING

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### ANAB Sections 7.8.1.2.1 and 7.8.1.2.2 / ISO/IEC 17025:2017(E) Sections 7.8.1.2 and 7.8.2.1

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Notes can be handwritten or electronically created. If notes are electronically created, the Crime Scene Specialist shall handwrite their initials, ID number, and date on the notes. Forms can be used for convenience. The original notes shall be included in the case packet. Notes shall not be rewritten/duplicated.

Notes shall not be written or printed on the back side of a form or note page. Abbreviations shall not be used unless listed on the approved Abbreviation List.

The following information shall be written or printed in the top right hand corner of each note page:

- Crime Scene Specialist's initials and ID number (must be handwritten).
- Current date.
- Case number or Incident number (if there is not a case number).
- Report designator (i.e. EPR, CSUR1).

If information is added or changed to the notes on a different date than originally documented on the note page, the Crime Scene Specialist shall initial and date adjacent to the newly added/changed note(s).

Disposition of evidence shall be indicated in the notes. If a controlled document ("Evidence Processing Report Note Page" or Crime Scene Face Sheet) is used, this is noted at the bottom and does not require to be handwritten. If not, the statement "Evidence will be impounded in accordance with Crime Scene Unit Policy" shall be handwritten in the notes.

If photographs are taken in the field or in the laboratory, the number of photographs transferred to the computer and the date transferred shall be documented in the notes.

## EVIDENCE PROCESSING

"Evidence Processing Report Note Page"(s) shall be used to document work performed during evidence processing. All fields of the note page(s) shall be completed (if applicable).

The barcode or a unique identifier for the item of evidence being processed shall be documented, along with a description of the item. The methods used to process the item(s) of evidence shall be documented to the fullest. The notes section provides an area for the Crime Scene Specialist to document items of importance. The notes section should be utilized in the following situations (among others):

- When using two swabs to collect possible DNA evidence.
- When methods are utilized and/or items are collected that do not provide a description (i.e. 15: Other additional items and 16: Other - Not Listed).
- When items within the packaging are not processed.

Copies of the note page photographs taken of the processed evidence shall be included in the case notes. It is not required that all note page photographs have to be included in the notes.

If lifts of developed prints are collected, copies of the informational side of the latent print cards shall be included in the case notes. If photographs of prints are taken, the areas that were photographed shall be documented (boxed) in the note page photographs included in the case notes.

If swabs of possible DNA evidence are collected, the area swabbed and the barcode of the swab shall be documented in the note page photographs included in the case notes. Brackets or other identifying marks should be used to identify areas that were swabbed with a description included (i.e. Swab of possible DNA evidence (12345678) blade of knife).

## **CRIME SCENE PROCESSING**

If a Crime Scene Specialist responds to several events relating to the same case, a Crime Scene Face Sheet should be used. Information can be handwritten or typed into this document. This document shall not substitute for a note page being generated for each event.

The following information (*at the least*) shall be documented in the notes of the case packet:

### **All scenes/events:**

- Incident number and case number (if applicable).
- Charge(s).
- Incident date.
- Scene/Event location (if known).
- Victim / Suspect (if known).
- Date and time of the following:
  - Arrival to scene/event.
  - First photograph taken.
  - First item collected/received.
  - Departure from scene/event.
- Trainee(s) and/or Criminalist(s) present (if applicable).
- Detective and Investigative Unit.

### **Subject Processing(s):**

- Subject's name.
- Subject's date of birth.

### **Autopsies:**

- Subject's name.
- Subject's date of birth.
- Medical Examiner's case number.
- Medical Examiner's name.
- Forensic Autopsy Specialist's name.

### **Vehicle processing(s):**

- Vehicle description, including license plate number and Vehicle Identification Number (if applicable).

If the Crime Scene Specialist attends a briefing, notes should be taken, which should include the name and ID number of the individual giving the briefing. It should be clearly noted that the information was obtained during a briefing. Start and end times given during a briefing should be documented (if applicable).

If a special technique (i.e. ninhydrin and luminol) is utilized in the field, it shall be documented in the notes. The areas that were processed using each technique and the results shall be listed.

When latent print processing is performed in the field the following information will be documented in the case notes:

- Techniques used.
- Areas processed and the results for each.
- Copies of the location photographs of the areas from which latent prints were lifted and collected (if applicable).
- Copies of the informational side of latent print cards (if applicable).

If a Criminalist assists in the investigation (i.e. luminol application, blood spatter interpretation, trajectory, etc.), it shall be documented in the case notes.

When back in the laboratory, if assistance is provided by a Criminalist (i.e. rendering a firearm safe, testing stains for the presence of blood, etc.), it shall be documented in the case notes. The date assistance was provided shall be noted. The assisting Criminalist shall initial and date the Crime Scene Specialist's notes.

If work normally performed is not done or if additional work is requested and performed, it should be documented in the case notes.

## 5.1 REPORTS

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**ANAB Sections 7.8.1.2.1 and 7.8.1.2.2 / ISO/IEC 17025:2017(E) Sections 7.8.1.2 and 7.8.2.1**

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### **EVIDENCE PROCESSING**

Upon the completion of processing the evidence on the laboratory request, the Crime Scene Specialist shall prepare a report. An Evidence Processing Report (EPR) shall be generated to reflect information on the "Evidence Processing Report Note Page"(s). There shall be a header before the evidence list that includes the following information:

- Location evidence was checked out from (Property/Narcotics Vault). If evidence is processed prior to impound, it shall be stated instead of location of check out.
- Date evidence was received or the start date for evidence processing (for processing prior to impound).
- All techniques utilized during processing.

Full descriptions of the items processed and items collected during processing shall be listed. Items collected during processing shall be listed in the results section for the item. If an item was processed for latent prints and no prints were observed or developed, it shall also be documented in the results section for the item.

A "Disposition of Evidence" section shall be the final section of the report. The following information shall be listed in this section (if applicable):

- Discs released to detective.
- Latent print cards/photographs.

If evidence related to a homicide case is processed, a Crime Scene Unit Report (CSUR) shall be generated in the same manner as a normal evidence processing request. If evidence processing is performed on evidence related to a scene/event processed by a Crime Scene Specialist, excluding homicides, it is at their discretion as to whether an Evidence Processing Report (EPR) or a Crime Scene Unit Report (CSUR) is generated.

### **CRIME SCENE PROCESSING**

A Crime Scene Unit Report (CSUR) shall be generated for all casework performed in the field. The report shall reflect all events that the Crime Scene Specialist responded to in relation to the case. Each event shall be given a header, which includes the following information:

- Location responded to.
- Arrival date and time.
- Who the Crime Scene Specialist met at the scene/event.
- Digital images taken and start time.
- Start time for collection or receiving of evidence.

A photo list shall be generated for photographs taken in the field and the laboratory, excluding note page photos taken as a part of evidence processing. All evidence collected and/or received, including evidence that was not given a barcode (if applicable), shall be accounted for and listed in the Evidence List(s) of the report. Discs created for the photographs listed in the report shall be accounted for in the "Discs" section, after the last event in the report.

A "Disposition of Evidence" section shall be the final section of the report. The following information shall be listed in this section (if applicable):

- Items released to another party, prior to impounding in the Property Room/Narcotics Vault.
- Discs released to detective.
- Latent print cards/photographs.

All Crime Scene Unit Reports should be completed within 21 days after all scene/event processing has been completed.

## **5.2 FINAL CASE DOCUMENTATION**

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### **EVIDENCE PROCESSING**

The case packet for evidence processing requests shall be prepared as follows:

- Report.
- Original laboratory request.
- “Evidence Processing Report Note Page”(s).
- Additional note pages.
- Note page photos.
- Copies of the informational side of latent print cards (if applicable).

### **CRIME SCENE PROCESSING**

The case packet for all work completed in the field shall be prepared as follows:

- Report.
- Crime Scene Face Sheet (if applicable).
- Original note pages.
- Copies of the location photographs of the areas from which latent prints were lifted and collected (if applicable).
- Copies of the informational side of latent print cards (if applicable).

NOTE: Chain of Custody forms (including from the Medical Examiner) shall be included in the notes portion of the report (if applicable).

After a Technical Review and an Administrative review are completed, the case packet shall be submitted to the Clerical Unit. The original report and original notes shall be stored in the laboratory case file. A copy of the case packet should be placed in the “Case File” folder on the G-Drive.

### 5.3 CASE REVIEW POLICY

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All Crime Scene Unit Reports (CSURs) and Evidence Processing Reports (EPRs) shall be submitted for technical review and administrative review. The technical review should be done by another Crime Scene Specialist and the administrative review should be done by the Supervising Crime Scene Specialist.

Crime Scene photographs shall be technically reviewed with each Crime Scene Unit Report (if applicable).

#### REVIEW ELEMENTS

The following elements shall be reviewed (if applicable) in the technical review and administrative review process:

##### **Evidence Processing and Crime Scene Processing:**

- A. Information in the header of the report and notes is correct.
- B. Notes are complete and legible.
- C. Dates and times (if applicable) are documented and consistent throughout (notes match with report).
- D. Latent print cards, photographs and discs are correctly labeled.\*
- E. Copies of the information side of the latent print cards are included in the notes.
- F. The information in the barcode system is correct.
- G. Information in the barcode system is consistent with the information documented in the report and notes.
- H. All required information is listed in the disposition of evidence.
- I. The report is signed.
- J. Appropriate controls are noted.
- K. Note pages are numbered and have the following written in the top right hand corner:
  - a. Crime Scene Specialist's initials and ID number.
  - b. Date.
  - c. Case number or Incident number (if there is not a case number).
  - d. Report designator (i.e. EPR, CSUR1).
- L. No write-overs or obliterations.
- M. If there are cross-outs, the Crime Scene Specialist initialed and dated (if different from the date documented on the note page).
- N. Disposition of evidence is indicated in the notes.
- O. Proper grammar, spelling, format and font are used.

##### **Evidence Processing (in addition to aforementioned elements):**

- A. All fields on the "Evidence Processing Report Note Page"(s) are filled out as completely as possible.
- B. Techniques performed during processing are detailed in the notes and report.

- C. Item descriptions, processing techniques, and results listed in the report are consistent with those documented in the notes.
- D. Photographs have the correct identifying information.\*

**Crime Scene Processing (in addition to aforementioned elements):**

- A. Photo list is correct and coherent.
- B. Descriptions of evidence are coherent.
- C. Locations from which evidence was collected are correct.
- D. If a specialized technique was utilized, it is documented in the notes, along with the areas processed and the results.
- E. Chain of Custody forms are complete and correct.

\*These fields do not need to be verified during the administrative review process.

In addition to the aforementioned review elements, the following shall also be reviewed during the administrative review processing:

- A. Technical review has been completed and documented.
- B. Administrative review has been documented.

Prior to being allowed to do a technical review, the Crime Scene Specialist shall review the review elements for both evidence processing and crime scene processing.



## 5.4 ABBREVIATION LIST

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Below is a list of approved abbreviations that can be used in the case notes of a report. Only the approved abbreviations can be used.

Word / Words	Abbreviation
Air Conditioner	AC or A/C
And	&
Acting	Act. or A. or A/
Automated External Defibrillator	AED
Administrative	Admin
Administrative Review	AR
Ammunition	Ammo
Apartment	Apt
Appointment	Appt
Approximately	Approx. or app or ~
April	Apr
Arrived	Arr
Asian Female	AF
Asian Male	AM
Assistant	Asst
At	@
Attorney	Atty
August	Aug
Avenue	Ave
Barcode	BC
Bedroom	Bdrm
Black	Blk
Black and white	B/W
Black Female	BF
Black Male	BM
Block	BLK

Blood	B
Body Worn Camera	BWC
Border Patrol	BP
Boulevard	Blvd
Brown	Brn
Building	Bldg
California	CA
California Driver License	CDL
California Highway Patrol	CHP
California Vehicle Code	CVC
Called	Call
Camera(s)	Cam(s)
Canine	K9
Canyon	Cyn
Captain	Capt
Cardio Pulmonary Resuscitation	CPR
Cellular	Cell
Center	Ctr
Centimeter	cm
Child Abuse	CHAB
Clear	Clr
Collect / Collection	Coll
Collected	Coll
Combination	Combo
Communications	Comm
Compact Disc	CD
Company	Co / Comp
Condominium	Condo
Court	Ct
Crime Laboratory	Crime Lab
Crime Scene Specialist	CSS
Crime Scene Unit	CSU

Crime Scene Unit Report	CSUR
Crime Scene Unit Studio	CSU Studio
Criminalist	Crim
Critical Incident Management Unit	CIMU
Custody	Cust
Customs & Border Protection	CBP
Dark	Dk
Deceased	Dec
December	Dec
Defense	Def
Deoxyribonucleic Acid	DNA
Departed	Dep
Department	Dept
Deputy District Attorney	DDA
Detective	Det
Diazafluoren	DFO
Digital Video Disc	DVD
District Attorney	DA
Doctor / Drive	Dr
Document	Doc.
Documentation	Doc
Dollar/Money	\$
Domestic Violence Unit	DV
East	E
Eastbound	EB
Eight	8th
Elimination	Elim
Equipment	Equip
Evidence	Evd / Evid
Evidence Processing Report	EPR
Example	Ex
February	Feb

Federal Bureau of Investigations	FBI
Feet	Ft
Fifth	5th
Fingerprint	FP
Fire Department	FD
First	1st
Fluid	Fl
Foot	Ft / '
Foot Bag	FB
Forensic Autopsy Specialist	FAS
Forensic Biology	FB
Forensic Chemistry	FC
Fourth	4th
Freezer Packet	FP
Friday	Fri
Gallon	Gal
Gang Suppression Team	GST
Girlfriend	GF
Global Positioning System	GPS
Gunshot Residue	GSR
Hand Bag	HB
Harbor Police	HP
Head Bag	HB
Head Quarters	HQ
Hispanic Female	HF
Hispanic Male	HM
Homicide	Hom
Hospital	Hosp
Hour	Hr
Hour[s]	Hr[s]
Hours	Hrs
Identification/Identify	ID

Impounded	Imp
Inch	In / "
Incident	Inc
Include	Incl
Information	Info
Initials	Int
Injury	Inj
Intensive Care Unit	ICU
Internal Affairs	IA
Investigator	Inv
January	Jan
Laboratory	Lab
Lane	Ln
Latent Print Examiner	LPE
Latent Print Unit	LPU
Latent Prints	LP [s]
Left	Lt
Left Foot Bag	LFB
Left Hand Bag	LHB
License	Lic
Lieutenant	Lt
Living Room	Liv rm
Location	Loc
Manufacturing	mfg
March	Mar
Medical	Med
Medical Examiner	ME
Medical Examiner Investigator	MEI
Millimeter	mm
Miniature	Mini
Minute	Min.
Monday	Mon

Mile Per Hour	MPH / mph
Metropolitan Transit System	MTS
Narcotics	Narc
Narcotics Street Team	NST
Negative	Neg
Nineth	9th
North	N
Northbound	NB
Northeast	NE
Northwest	NW
Not Applicable	N/A
November	Nov
Number	#
October	Oct
Officer	Off
Officer Involved Shooting	OIS
Original	Orig
Other names	Et al
Ounce	Oz
Page	Pg
Parking	Pking
Passenger	Pass
Penal Code	PC
Psychiatric Emergency Response Team	PERT
Photography	PH
Photography	Photo(s)
Placard	Plac
Place	Pl
Positive	Pos
Possible	Poss
Post Office Box	PO
Processing	Proc

Approved By: Joe Berner, Supervising Crime Scene Specialist  
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Pronounce	Pron
Quality Assurance	QA
Quarts	Qts
Question Documents	QD
Question[s]	?
Railroad	RR
Receive / Received	Rec or Rec'd
Recreational Vehicle	RV
Registered	Reg
Reporting Party	RP
Request	Req
Right	Rt
Right Foot Bag	RFB
Right Hand Bag	RHB
Road	Rd
Robbery	Robb
Room	RM
San Diego	SD
San Diego Fire Department	SDFD
San Diego Police Department	SDPD
San Diego Sheriffs Department	SDSO
Saturday	Sat
Scare	SC
Schedule	Sched
Second	2nd
September	Sep
Sergeant	Sgt
Serial Number	SN
Seventh	7th
Sex Crimes	S/C
Sexual Assault Response Team	SART
Sixth	6th

Small Particle Reagent	SPR
South	S
Southbound	SB
Southeast	SE
Southwest	SW
Special Weapons and Tactics	SWAT
Sports Utility Vehicle	SUV
Square	Sq
States	State Abbreviation
Street	St
Subject	(Subj)
Suite	Ste
Sunday	Sun
Supervising Crime Scene Specialist	SCSS
Supplemental	Supp
Surgical Intensive Care Unit	SICU
Suspect	(S) / Susp
Team	Tm
Technical Review	TR
Television	TV
Temperature	Temp
Tenth	10th
Third	3rd
Thursday	Thur
Time of Arrival	TOA
Time of Call	TOC
Time of Death	TOD
Traffic Investigation Unit	TIU
Transport	Xport
Treatment	Tx
Tuesday	Tue
United States	US



United States Marshal	US Marshal
Universal Product Code	UPC
Urine	U
Universal Serial Bus	USB
Vacuum Metal Deposition	VMD
Vehicle	Veh
Vehicle Identification Number	VIN
Victim	(V) / Vic
Volume	Vol
Wednesday	Wed
Week	Wk
West	W
Westbound	WB
White	Wht
White Female	WF
White Male	WM
With	W/
With	τ
Without	W/O
Witness	(W)
Yard	Yd
Year	Yr

## 6.0 QUALITY ASSURANCE MEASURES

### ANAB Sections 6.4.3.1 / ISO/IEC 17025:2017(E) Sections 6.4.3, 6.4.10 and 6.6.1

#### REAGENTS

When reagents are used, controls shall be used, when necessary, to ensure the functionality and reliability of the reagent. Table 3 is a list of the reagents/processes used in the laboratory and their control requirements.

Reagent/Process	Control	Frequency	Positive Control Result
Amido Black	Acetate with known bloodstain	Per batch	Blue/black-colored stain
Ardrox	Cyanoacrylate fumed print	Per batch	Fluorescent with ALS
Coomassie Blue	Acetate with known bloodstain	Per batch	Blue-colored stain
Crystal Violet (Gentian)	Tape with print	Per use	Violet-colored print
Cyanoacrylate Ester Fuming	Black card or acetate with print	Per use	White-colored print
DFO	Paper with print	Per batch	Pink/red-colored print or fluorescent with ALS
Ninhydrin (Acetone)	Paper with print	Per batch	Purple-colored print
Ninhydrin (Heptane)	Paper with print	Per batch	Purple-colored print
Physical Developer	Wet paper with print	Per use	Black/gray-colored print
Polilight PL500	Known biological fluid stain	Per use	Fluorescent stain
Powders (black, magnetic, fluorescent)	None	N/A	N/A
Powder Suspension Solution	Tape with print	Per use	White/black-colored print
Radiant Orange	Cyanoacrylate fumed print	Per batch	Fluorescent with ALS
Rhodamine 6G	Cyanoacrylate fumed print	Per batch	Fluorescent with ALS
Small Particle Reagent	Wet acetate with print	Per use	Gray/silver-colored print
Sticky-Side Powder	Tape with print	Per use	White/black-colored print
Sudan Black	Acetate with print	Per batch	Blue/black-colored print
Thermal Paper Washout	Thermal paper	Per use	Black/gray residue washes away
Un-Du	None	N/A	N/A
Vacuum Metal Deposition	Black/White card with print	Per use	Gray/silver-colored print

**Table 3.** This table represents the reagents/processes used, the control and frequency required, and the expected results of a positive control for each.

The Crime Scene Unit shall maintain a reagent log, which shall track the following information:

**Reagents made in the laboratory**

- Lot number.
- Date made.
- Manufacturer lot number.
- Expiration date.
- Who the reagent was prepared by.
- Results of the control.
- First date the reagent was used.

**Reagents made by the manufacturer**

- Date received.
- Date opened.
- Who the reagent was tested by.
- Results of the control.
- First date the reagent was used.

Reagent preparation can be found in this manual in the section correlating to the specific technique.

Prepared reagents shall be labeled with the following information:

- |  |                     |
|--|---------------------|
| • Name of the reagent.                                 | • Lot number.       |
| • Who the reagent was prepared by.                     | • Expiration date.  |
| • Date the reagent was prepared.                       | • Container number. |
| • Storage instructions (i.e. "RT" - Room Temperature). | • Signal Word.      |
|  | • GHS Pictogram.    |

## **EQUIPMENT**

Maintenance logs shall be maintained for the MVC5000 Cyanoacrylate Fuming Chambers, the Caron 6105 Fingerprint Development Chamber, Electrostatic Dust Print Lifters, Metal Detectors, Alternate Light Sources, and the Vacuum Metal Deposition Chamber.

Maintenance performed on equipment by external sources shall be performed by certified service professionals or trained professionals.

The Cyanoacrylate Fuming Chambers require filters to be changed on a regular basis. A Filter Change Log shall be maintained for each chamber, indicating the date the filters were changed.

Controls shall be used, when necessary, to ensure the operability and reliability of the equipment.

Cameras shall be routinely checked to ensure operability. If the quality of photographs taken by a camera declines or if a camera does not seem to be functioning correctly, it shall be taken out of service to be repaired and/or cleaned if necessary.

## **1:1 PRINTED IMAGES**

If 1:1 images are printed, the Crime Scene Specialist shall verify the image as 1:1, prior to being released to laboratory or sworn personnel.

## **6.1 CARRYING A CONCEALED WEAPON POLICY**

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### **INDIVIDUALS APPROVED TO APPLY FOR A CONCEALED CARRY PERMIT (CCW)**

Only those deemed as “qualified personnel” can be approved to apply for a concealed carry permit through the Department. This will include all current crime scene personnel to encompass Crime Scene Specialists, Crime Scene Reconstruction Team members and trainees, as well as Criminalists who respond to crime scenes as part of their regular duties.

### **CCW RESTRICTIONS**

Concealed carry permits are issued by the San Diego County Sheriff’s Office. The Department shall support the concealed carry permit with the following policy restrictions:

- Valid only in the course of duties as a Crime Scene Specialist with the San Diego Police Department.
- Valid only while the employee is on-duty.

NOTE: On-duty is defined as any field work done outside of a police facility. This includes traveling to and from crime scenes. In addition, an employee who is actively on-call and may need to respond to a crime scene from his or her current location is considered on-duty.

### **TRAINING**

A qualified employee shall complete in-service firearms training, and fulfill all other requirements as set forth for firearms qualifications, as outlined in Department Procedure 1.05.

### **EXPECTATIONS**

All Department policies and procedures regarding firearm safety must be adhered to.

A qualified employee authorized by the Chief of Police to carry a firearm during the course of their duties shall be required to carry the firearm while on duty. Refer to Department Procedure 12.2 for the interpretation of on-duty for purposes of this policy.

“Carrying” means that the firearm is physically on the employee’s person, either in a holster or in an attached bag (fanny pack). Carrying does not include keeping the firearm in a crime scene kit, or in a locked vehicle.

A qualified employee shall be required to sign an acknowledgment and agreement of the above policy, as well as Department Procedure 1.05. This acknowledgement will be kept in the employee’s divisional file.

Any employee who feels an unrestricted concealed carry permit is appropriate for their case can petition the Laboratory manager in writing to have the restrictions lifted.

Approved By: Joe Berner, Supervising Crime Scene Specialist  
Crime Scene Unit Manual  
July 1, 2019

## **6.2 UNIT EQUIPMENT AND SUPPLIES**

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### **ISO/IEC 17025:2017(E) Sections 6.6.1 and 6.6.2**

The Crime Scene Unit utilizes a variety of equipment and supplies in the field and in the laboratory. All equipment is maintained to ensure operability and reliability. The supplies utilized by the Crime Scene Unit have been approved for use.

All supplies used by the Crime Scene Unit shall be evaluated annually (at the time of renewing contracts) to ensure suitability and quality by the Supervising Crime Scene Specialist or Technical Lead.

The following is the minimum criteria required for the selection of purchasing of camera equipment for the Crime Scene Unit:

- Shall have the capability of capturing images at a minimum resolution of 1000 ppi.
- Shall have the capability of capturing images in the JPEG, TIFF and RAW formats.
- Shall have the capability of accepting multiple lenses ranging from at least 18mm to 200mm.
- Shall have the capability of accepting an external flash.
- Shall have the capability of being mounted onto a tripod.