

Latent Print Units Processing Manual

Preamble

1 Scope

The Latent Print Units use a variety of techniques and procedures to detect latent prints. The Preamble provides overall information addressing processes utilized in the Latent Print Units, to include: chemicals and reagents used in the processes; reagent checks; processing sequences; preservation of visualized prints; and hazardous waste management. Personnel will refer to the specific procedure for each process to obtain more detailed information on that process. These procedures are intended for use by appropriately qualified employees who have received training in the processes used to develop latent prints or chemicals used for processing. Available resources in addition to the judgment of the person conducting the processing (within the bounds of good laboratory technique and quality control) determine what examination procedures are appropriate and/or acceptable for certain circumstances as encountered in the daily forensic casework of the Latent Print Units.

2 Equipment/Materials/Reagents

The equipment, materials, or reagents used in each process are listed in the specific standard operating procedure. Unless noted in the individual standard operating procedure, the reagents used in the mixing of processing solutions are American Chemical Society grade or equivalent. Unless the process specifically requires distilled water, the water used for the standard operating procedure can be distilled, reverse osmosis, deionized, or tap.

3 Standards and Controls

Control samples show the effectiveness of the reagent. A control sample will consist of a substance the reagent is expected to react with on a surface appropriate for testing. Since personnel process in a variety of locations, the availability of materials to create test samples will vary but will be appropriate to what reagent is being tested (e.g. paper with sebaceous/eccrine/other matrix components for porous processes, aluminum dish with sebaceous/eccrine/other matrix components for superglue fuming, blood on an appropriate porous/non-porous substrate for blood processes, adhesive side of tape with sebaceous/eccrine/other matrix components for tape processes, or a superglue processed item for cyanoacrylate dyes). Control samples may be created at the time the reagent is tested or produced en masse for routine testing.

3.1 Reagent Checks

If prints are developed on the control sample, it is noted in the appropriate log book or case record (only for offsite work) and the working solution is approved for use in casework. If prints

are not developed on the control sample, a new control sample is processed to determine the reason for the lack of development, such as a faulty control sample. If prints are developed on the new control sample, the results will be entered into the appropriate log book or case record (only for offsite work) and the working solution will be ready to be used for casework. In situations where prints are not developed on the new control sample, the working solution will not be used and the results entered into the appropriate log book or case record. At this time, the preparer will attempt to determine the reasons why the solution is not properly working.

The Latent Print Units test most working solutions when they are prepared and prior to use, provided it has been 24 hours since the solution was tested. The only exceptions are cyanoacrylate and the working solutions of RAM (combination of fluorescent dyes **R**hodamine 6G, **A**rdrox P133D, and **M**BD), Ninhydrin, and 1,2-Indanedione-Zinc.

For the Quantico laboratory location, RAM and 1,2-Indanedione-Zinc working solutions are tested when they are first mixed and weekly thereafter while in use.

For the Huntsville laboratory location, RAM, 1,2-Indanedione-Zinc, and Ninhydrin working solutions are tested when they are first mixed. RAM, 1,2-Indanedione-Zinc, and Ninhydrin working solutions outside the Biohazard room are tested weekly thereafter while in use.

The first container of cyanoacrylate from each box will be tested at the time of opening prior to being used for processing. In addition, a control sample must be included anytime the cyanoacrylate fuming process is used outside of a standard chamber as described in that standard operating procedure. The use of this control strip will be recorded in the case record. The individual standard operating procedure for each process will be followed when tests are conducted.

4 Sampling

Not applicable.

5 Procedures

A **latent print** is defined as a transferred impression of friction ridge detail that is not readily visible and/or a generic term used for unintentionally deposited friction ridge detail.

The **matrix** is defined as the substance that makes up the latent print. The matrix can consist of a single substance, or a combination of substances, which generally includes perspiration or oil from an individual. Other substances, such as blood, grease, paint, dust, and other compounds that allow the friction ridge details to transfer to an object, can also be a matrix. The type and condition of the matrix contributes to determining how a specimen should be processed for latent prints.

The **substrate** is defined as the surface that a latent print has (or may have) been deposited on. In general, surfaces on which latent prints are deposited can be divided into porous, non-porous, and semi-porous categories. The type and condition of the substrate contributes to determining how a specimen should be processed for latent prints.

To minimize destruction and maximize detection of latent prints, it is necessary to use proper processing techniques and sequences. Personnel conducting examinations must use appropriate judgment in determining which processes to use, inasmuch as not all processes will be used in every situation.

6 Sequences for Various Types of Substrates

The following is a set of processing sequences to be used as a guideline when processing specimens for the presence and development of latent prints. The lists show the optimal sequence of processing; however personnel conducting examinations will determine which processes are needed for each particular substrate and matrix combination. The processes used by personnel are based on the efficiency and limitations of the process, availability of resources, the circumstances of the case, and the type and condition of the evidence items. Some processes, such as Small Particle Reagent and Ninhydrin (as appropriate) are used in very specific circumstances. When using powders (magnetic or non-magnetic) or powder suspensions (e.g., Alternate Black Powder), the choice of color or process is made by personnel and is based upon establishing suitable contrast with the color of the substrate.

A visual examination is the examination of an item of evidence for friction ridge prints, in sufficient lighting conditions, using the individual's eyes or with the assistance of a magnification device. Visual examinations are implied for each process listed in the sequences. Note: Ultra Violet light may be detrimental to DNA examinations.

6.1 Porous

- Visual
- Forensic Light Source(s)
- 1,2-Indanedione-Zinc or Ninhydrin
- Physical Developer

6.2 Non-Porous

- Visual
- Forensic Light Source(s)
- Cyanoacrylate fuming with Forensic Light Source(s)
- Cyanoacrylate dye with Forensic Light Source(s)
- Powder

6.3 Semi-Porous

- Visual
- Forensic Light Source(s)
- Cyanoacrylate fuming with Forensic Light Source(s)
- Magnetic Powder
- 1,2-Indanedione-Zinc or Ninhydrin
- Cyanoacrylate dye with Forensic Light Source(s)
- Physical Developer

6.4 Blood Stained Items - Porous

- Visual
- Forensic Light Source(s)
- 1,2-Indanedione-Zinc or Ninhydrin
- Diaminobenzidine (submersion method) or Amido Black
- Physical Developer

6.5 Blood Stained Items – Non-Porous

- Visual
- Forensic Light Source(s)
- Diaminobenzidine (tissue method), Leucocrystal Violet, or Amido Black
- Cyanoacrylate fuming with Forensic Light Source(s)
- Cyanoacrylate dye with Forensic Light Source(s)
- Powder

6.6 Semi-Porous (Latex/Nitrile Glove Type Products)

- Visual
- Forensic Light Source(s)
- Cyanoacrylate fuming with Forensic Light Source(s)
- Magnetic Powder
- Cyanoacrylate dye with Forensic Light Source(s)
- Physical Developer

6.7 Adhesive Surfaces

The appropriate processing sequence should be used on the non-adhesive surface, if present. When processing the non-adhesive side, the integrity of the adhesive side should not be compromised by coming into contact with cyanoacrylate dyes or other solvents. An appropriate backing should be utilized to protect the adhesive side.

Adhesives affixed to items should be removed prior to processing to prevent damage to the

adhesive side and to maximize detection of potential latent prints on the non-adhesive side. However, cyanoacrylate fuming should be performed on the non-adhesive side of semi-porous and non-porous adhesive items prior to removal.

Note: Fluorescent dye stains may be detrimental to fiber examinations.

6.7.1 Light Colored Adhesive Side

- Visual
- Forensic Light Source(s)
- Alternate Black Powder, Ash Gray Powder or Wetwop™ Black

6.7.2 Dark Colored Adhesive Side

- Visual
- Forensic Light Source(s)
- Ash Gray Powder or Wetwop™ White

7 Preservation

At the conclusion of each process, all evidence will be examined for friction ridge prints. If sufficient friction ridge information is not present on a specimen, personnel conducting the examination may move on to a subsequent process. If sufficient friction ridge information is present on a specimen and not already preserved, personnel conducting the examination will ensure that the friction ridge information is preserved, usually through digital capture or photography.

7.1 Digital Capture and Photography

The most common method of preserving friction ridge information is through digital capture or photography. An identifier tag with a scale or measurable item must be captured with each specimen. If a measurable item is utilized, the appropriate measurement must be taken with an American National Standards Institute/National Institute of Standards and Technology ruler and the measurement recorded in the case record.

The print will be digitally or photographically captured (see FBI Latent Print Units Operations Manual, Standard Operating Procedures for Digital Images). If processing personnel are requesting the assistance of dedicated image capture personnel for acquiring images, he/she will do the following:

- Mark each print, using caution to avoid damaging the evidence or disturbing other potential latent prints.
- Prepare a photographic requisition using the appropriate request system. If the system is unavailable, the processing personnel will record the requisition in the case notes or use the *Latent Fingerprint Section Photographic Unit*

Requisition form (7-230) (Appendix A).

- Use appropriate evidence tracking methods.
- After the evidence is returned, determine if the print(s) has been captured accurately. Any issues with returned work will be brought to the photographer's attention to be addressed.
- Once accurate images have been obtained, move on to a subsequent process as applicable.

Note: Fluorescent compounds will suffer from loss of intensity over time; as such, these prints will be captured as soon as is practicable.

7.2 Lifting or Casting

Processing personnel may preserve friction ridge prints by lifting or casting if properly trained. Lifting or casting may be done at any time in the processing sequence. Prior to lifting or casting, an attempt will be made to capture the friction ridge information photographically or digitally.

All lifts or casts will be captured photographically or digitally for retention as part of the case record. If the print(s), as it appears on the lift or cast, is claimed, the lift(s) will be returned to the contributor as secondary evidence. Any lift or cast with no claimed print(s) will not be retained; however, personnel may return the lift or cast as secondary evidence. All lifts or casts returned as secondary evidence will be marked with the source, date of capture, and individual who created the lift or cast in addition to the Laboratory number and Item number.

8 Calculations

Not applicable.

9 Measurement Uncertainty

Not applicable.

10 Limitations

Not applicable

11 Safety

Personnel will reference the FBI Laboratory *Safety Manual* for guidance on Laboratory waste management practices and procedures in addition to other topics on laboratory safety. Any questions will be addressed to the appropriate safety personnel.

Processing personnel using any of these procedures must be familiar with the Safety Data Sheets for each chemical used in the process. Processing personnel will follow universal precautions when handling blood or other potentially infectious materials.

For all processes included in this manual, processing personnel will wear appropriate laboratory coats, gloves, shoes, and safety glasses. Additional personal protective equipment specific to a process will be listed in that process's section of the manual.

12 References

Latent Print Unit Quality Assurance Manual, Procedures for Management of Equipment, Chemicals, Supplies, and Services. Federal Bureau of Investigation, Laboratory Division. Latest Revision.

FBI Laboratory Safety Manual. Federal Bureau of Investigation, Laboratory Division. Latest Revision.

| Rev. # | Issue Date: | History |
|--------|-------------|--|
| 6 | 05/30/18 | Section 3, added clarification on control sample. Section 6, ultraviolet note is made more general. Section 6.6, removed Iodine Spray Reagent. Section 6.7, specificity of items removed and non-porous added for fuming. Section 7.1, "as applicable" added to last bullet. Section 7.2, qualification requirement added. |
| 7 | 08/21/19 | Section 4, changed heading. Removed discontinued exams from Section 6 and Section 6.5. Removed acetate from Section 6.7. Modified requirement for personnel for lifting, added casting and removed lift examples in Section 7.2. |

Approval

Redacted - Signatures on File

Latent Print
Technical Leader

Date: 08/02/2019

Latent Print Operations
Unit Chief

Date: 08/02/2019

Latent Print Support
Unit Chief

Date: 08/02/2019

Scientific and Biometrics
Analysis Unit Chief

Date: 08/02/2019

QA Approval

Quality Manager

Date: 08/02/2019

Appendix A: Latent Fingerprint Section Photographic Unit Requisition

Redacted - Form on File

Standard Operating Procedures for Digital Images

1 Scope

Digital capture is used for the true and accurate recording of images, such as latent prints and known prints, while digital processing is used to improve the quality of friction ridge print images in a controlled and repeatable manner.

This document addresses the capture, processing, output, storage, and security of digital images for friction ridge print examination. Requirements for digital images/processing in the Next Generation Identification System are documented in the FBI Friction Ridge Discipline Operations Manual, Standard Operating Procedures for the Next Generation Identification System.

These procedures apply to appropriate personnel in the Friction Ridge Discipline, Operational Projects Unit, and Evidence Management Unit who create and/or utilize digital images as part of their current position, have received the appropriate training, and are supporting Friction Ridge Discipline casework.

2 Equipment/Materials/Reagents

The Technology Development Program Manager or Latent Imaging Team Supervisor will ensure a list of the specific items of digital equipment and software used by the Latent Print Support Unit and the Latent Print Operations Unit will be maintained. The Huntsville Laboratory Manager will ensure that a list of those items maintained by the Scientific and Biometrics Analysis Unit will be retained. Evidence Management Unit and the Operational Projects Unit will retain equipment and software listings per their own requirements.

3 Requirements for Digital Images

3.1 Captured Friction Ridge Prints

Digital images of friction ridge prints captured by Friction Ridge Discipline, Operational Projects Unit, and Evidence Management Unit personnel in support of Friction Ridge Discipline casework must include (documentation may be in written or electronic format):

1. Documentation of image source (e.g., item number, known card, substrate).
2. Documentation of capture device (e.g., scanner, digital camera).

3. Documentation indicating the image or photograph is an original capture, either through documentation in the case record or through the file metadata.

The following file properties, recorded through documentation in the case record or by the file metadata, are strongly recommended; however, not meeting these recommendations does not render the image unusable for examinations.

- A file format without compression or with lossless compression (e.g., RAW, TIFF) or with WSQ compression saved at a maximum of 15:1. JPEG 2000 will be accepted only with additional documentation in the case record that ensures the file is without compression or with lossless compression.
- A minimum of 8 bits per channel (8 bit for grayscale images and 24 bit for RGB color images).
- A resolution that meets or exceeds 1000 ppi when scaled to actual size (1:1) for latent prints and non-standard intentionally recorded prints
- A resolution that meets or exceeds 500 ppi when scaled to actual size (1:1) for standard intentionally recorded prints.

All images should be viewed to confirm the information is sufficient for examinations and prints recaptured, if possible.

3.2 Images of Friction Ridge Prints Submitted to the FBI Laboratory

Personnel will refer to the FBI Friction Ridge Discipline Quality Assurance Manual, Procedures for Case Acceptance for submitted digital evidence.

3.3 Requirements for Digital Images of Object Shots Captured in the Laboratory

Object shots of items that require a questioned document examination must be captured at a minimum resolution of 400 ppi when scaled to actual size (1:1), and the captured image must contain a scale. When requesting capture by forensic imaging personnel, a resolution of 400 ppi or higher must be specifically asked for by the requestor. All other object shots may be captured in the manner best suited for the object in question.

3.4 Requirements for Digital Image Processing

The original image will remain unaltered. A working copy of the original image will be created and used for digital processing to preserve the integrity of the original image. Digital image processing must not misrepresent nor compromise the integrity of the friction ridge print information contained in the original image. Digital image processes that cannot be used on a working image include, but are not limited to:

- Cloning/Healing tools
- Airbrush
- Paintbrush

- Paint bucket
- Eraser
- Vector based tools
- Filters (except Chromatic FFT/Calibration)
- File format conversion involving a lossy compression (e.g., TIFF to JPEG)

Dodge/burn may be used but must not isolate less than five ridges or be applied in the direction of the ridge flow.

Reversing the color and reversing the position are considered digital processing and must be tracked in the digital history. Scaling is not considered a digital process.

In addition to the approved Photoshop image processing tools, only Approved Photoshop Actions can be used from the Actions menu. Actions may not be altered.

3.5 Requirements for Image Output

An output device must be capable of producing a visually accurate representation of the input image. Unless materials are not available, images will be printed on glossy or photo-quality paper.

As necessary, personnel may reduce the resolution in order to produce an image of sufficient file size to be printed on digital printers. The re-scaled image is not required to be retained and personnel are not required to record the action in the case record. Any retained re-scaled image files must be clearly marked as such and used only for printing.

Personnel will utilize a printing method that produces the best quality images (e.g., printing latent prints directly from the printer at the Quantico site versus printing over the network).

3.6 Requirements for Digital Image Retention Systems

All digital imaging casework will be conducted in the appropriate digital image retention system as designated by management. Exceptions include work conducted in the Next Generation Identification System or situations listed in Section 3.7 through Section 3.7.2. The digital image retention system is considered a part of the case record and all work performed within the system will follow the guidelines below:

- System case identifier must be associated with submission and recorded in the case record.
- All images should be directly captured into the system. Images unable to be captured directly will be imported into the digital image retention system without additional change or alteration from original capture.
- Original image(s), all final processed image(s), and digital history must be retained.

- All work conducted in the system must be performed under the individual's login and clearly associated with the appropriate individual.
- Each image must be associated with its respective item identifier (if assigned).
- Captured images that are not to be used for examination (i.e. retained test image) will be so designated.

3.6.1 Image Deletion in Digital Image Retention System

Images will not be deleted from a digital image retention system. However, situations may arise that necessitate the removal of one or more images from the system (e.g. system errors, classification, or personnel oversight) for clarity or continuity.

Prior to deletion, personnel will attempt to confirm the image and any available asset information are retained or recaptured in the case record. A notation will be included in the digital image retention system case that states why the image was deleted, who performed the deletion, and when the image was deleted. If the presence of the image or asset information is unable to be confirmed in the case record, a notation will be added to the digital image retention system case.

3.7 Conducting Work Outside the Digital Image Retention System

Digital imaging casework may be conducted outside of the system in specific situations. See Section 3.7.1 if the system is temporarily unavailable or the work is related to a Consensus Panel, or Section 3.7.2 if the digital image retention system cannot be used at all for capture and/or processing.

3.7.1 Requirements for When the Digital Image Retention System is Temporarily Unavailable or for Work Conducted for a Consensus Panel

The system may be temporarily unavailable due to issues with the location or the system itself, or a Consensus Panel is active and shall work outside the system to limit contextual information. A notation will be added to the case record indicating the system is unavailable and why unless associated with a Consensus Panel. The original file, final processed file, and the digital processing history (either digitally or through written documentation) will be retained. File names will be associated with the Laboratory number. Original and processed files must be clearly distinguishable and easily connected to each other. Information will be temporarily retained on digital media or stored on a drive. The temporary storage is not considered the final record.

Any retained digital images and history must be imported into the appropriate digital image retention system once the system is restored or the Consensus Panel has concluded. Each image must be associated with its respective item identifier (if assigned). Examples of this include adding the item identifier to the asset name, digital image retention system notes or description, or by appropriately tagging the images. Captured images that do not meet a quality assurance check or otherwise should not be used for examination will have some designation that these

images will not be used for examination. Once the images have been successfully uploaded into the digital image retention system, any temporary digital media do not need to be retained in the case record. The case record must reflect the retention of images and disposal of temporary digital media, as appropriate.

3.7.2 Requirements for When the Digital Image Retention System Cannot be Used

Work cannot be conducted in the digital image retention system nor can images be imported to the system for certain case situations (e.g., classification issues, Foreign Intelligence Surveillance Act cases, some Confidential Human Source cases, and some Terrorist Explosive Device Analytical Center cases). In the event that a digital image must be captured and/or processed outside of the digital image retention system, the original file(s), final processed file(s), and the digital processing history (either digitally or through written documentation) will be retained in the case record. File names will be associated with the Laboratory number. Original and processed files must be clearly distinguishable and easily connected to each other.

Each image must be associated with its respective item identifier (if assigned). Examples of this include adding the item designation to the file name or retaining the images under a folder bearing the item designation. Captured images that do not meet a quality assurance check or otherwise should not be used for examination will have some designation that these images will not be used for examination.

In such situations where images will not be uploaded into the digital image retention system at any time, images and history will be recorded to digital media for retention in the physical case record. The digital media will be retained and personnel will note in the case record where the digital media is retained.

Personnel will refer to the appropriate documents to determine if secondary evidence is required.

3.7.3 Requirements for Image Storage on Digital Media

Any digital files retained in the physical case record must be recorded on digital media. Disc(s) or other media that can be finalized are preferred; however, circumstances may require the use of other forms of digital media. All digital media used must have some mechanism to prevent the addition to or changing of files after the initial recording session.

The user should view the image files from the digital media to ensure they were successfully recorded.

Retained digital media will be labeled with, at a minimum, the following information:

- Laboratory number(s)
- Date file(s) recorded to the digital media
- Classification level
- Handwritten initials of issuing examiner (if applicable)

- Handwritten initials of FBI Laboratory personnel responsible for the capture and/or the digital processing of the retained images..

A record of all item numbers stored on the retained digital media must be preserved in the case record. Personnel may write the item identifiers on the digital media, record the identifiers in the case notes, or retain a print out of the image files with the item identifiers. It must be clear which item identifiers are contained on which digital media.

Personnel may consolidate files to a smaller number of discs or other digital media, but no required images may be omitted. The creation of the new digital media and any disposal of the original digital media must be recorded in the case record, and all personnel who initialed the original digital media must initial the consolidated digital media containing their work. Personnel may also retain the original digital media. If the original digital media is retained, the handwritten initials of personnel responsible for the capture or processing are not needed on the final digital media.

3.8 Requirements for Discovery Requests or Testimony

Digital images used for demonstrative purposes in testimony must be true representations of the evidence. Illustrative aids (e.g., lines, letters, labels) may be applied to the image to demonstrate the Analysis, Comparison, and Evaluation process.

When a request is made for the examination records, the examiner must provide a copy of the images contained in the case record in addition to the digital processing history or digital assets of all images.

4 Procedures

4.1 Digital Images Submitted by a Contributor

4.1.1 Submitted Digital Files

The case record will contain a copy of every electronically submitted file that passes the virus scan (e.g., disc, email) or is retrieved from FBINET. Ideally, the files will be retained in the digital image retention system; however, other means are acceptable, such as retaining a copy of the images on digital media, in MorphoBIS, or in Sentinel. A hardcopy of the file will not meet the requirement. If the images were submitted by email, a copy of the email will be retained in the case record.

Images that will not be used for examination (e.g., object shots, duplicate images, non-evidentiary images) will be designated as such.

For each file submitted electronically, the case record will record the date or date range when the images were examined as well as who conducted the examination.

File names will be associated with the Laboratory number and original file name (folder names are acceptable). Original and processed files must be clearly distinguishable and easily connected to each other.

All work conducted in the digital image retention system must be performed under the individual's login to accurately record all activity associated with an image. All work must be clearly associated with the appropriate individual.

4.1.1.1 Submitted Images of Latent Prints and Non-Standard Intentionally Recorded Prints

When an examiner claims a print(s) on a submitted digital image, the original contributor file name of the image and original image source (e.g., "indicated to be from a car door"), if available, will be maintained in the case record (e.g., notes, Adams Web, or MorphoBIS). In the case record, each suitable for comparison print must be associated with an original file name.

When a submitted digital image is examined and does not contain a print(s) suitable for comparison, the analysis decision must be recorded in the case record.

4.1.1.2 Submitted Images of Standard Intentionally Recorded Prints

If all recordings of all fingers within the submitted image(s) of a standard intentionally recorded print(s) are not suitable for comparison, the analysis will be recorded in the case notes.

4.2 Digital Images Captured by Personnel Listed in Scope

All captured images will contain a verified scale or other measurable item as described in Section 5. Meeting the requirements for digital capture and/or processing will be the responsibility of the party capturing the image or conducting the digital processing. The Laboratory number, date, process (if applicable), and item identifier must be associated with each image, and, if possible, all information on an identification tag will be recorded. It is not necessary to maintain any exploratory images or test images in the case record.

When using the digital image retention system, if personnel determine that an image does not meet requirements or did not pass the quality assurance check, the image will be designated as such (includes both the original and any applicable digitally processed versions) in the case record.

For all captured images, the following must be contained in the case record:

- Copy of the original captured image
- Copy of the final processed image, if applicable

- Processing history, including date(s) of processing, if applicable
- Name of individual who captured the original image
- Name of individual(s) who conducted any digital processing
- Date the original image was captured

All actions must be clearly associated with the person who performed them.

4.2.1 Analysis/Comparison/Evaluation Work

Examiners may mark information on images in conjunction with any part of the Analysis, Comparison, and Evaluation process. If the examiner scans or captures a print(s), all captures must be through the digital image retention system. If the examiner uses existing digital images, any digital processing must occur through the digital image retention system and the additional digital processing will be retained. Images that cannot be retained in a digital retention system will be captured, processed and/or retained as detailed in Section 3.7 through Section 3.7.2.

Annotations made to document any part of the Analysis, Comparison, and Evaluation process are not considered digital processing; however, a record of final annotations must be retained in the case record. If annotations are retained within a digital image retention system or on digital media, all work must be clearly associated with the individual who performed it.

5 Identifier Tags or Scale Verification

Each batch of identifier tags received from the printing vendor will be measured against American National Standards Institute /National Institute of Standards and Technology rulers to ensure the accuracy of the size of the scale after printing. Tags on the first and last page, and at least every 500th sheet (full sheet or strip) will be measured. In capture systems where measured tags cannot be used, the system ruler will be measured against the ruler and recorded either in a log book or in the case notes. These measurements and quality checks will be tracked by the Standards and Practices Program Manager and the Huntsville Laboratory Manager.

Personnel must use measured or quality checked identifier tags or must verify the size of any tags they create using the American National Standards Institute /National Institute of Standards and Technology rulers. If a measurable item is used for a scale in images captured in the FBI Laboratory, the value for the measurable item must be taken with the rulers. These checks must be recorded in the case record.

6 Terrorist Analysis Group Known Standard Library

The Terrorist Analysis Group Known Standard Library consists of fingerprints and secondary biometrics, submitted to or obtained by the Latent Print Operations Unit, of individuals suspected of involvement in terrorist activities and/or major cases. The Terrorist Analysis Group

Known Standard Library is not considered an individual characteristic database or reference collection and is maintained by the Latent Print Operations Unit at the FBI Laboratory in Quantico. The Terrorist Analysis Group Known Standard Library currently consists of digital captures of the following known recordings: recordings taken by Friction Ridge Discipline personnel of persons of interest in major cases; originals, negatives, and/or copies of records that have been submitted to the Laboratory as part of a case; and composite records of identified known or latent prints. All records, with the exception of the composite records, contained in the Library are also retained in the Next Generation Identification System. The Terrorist Analysis Group Known Standard Library is an extension of the case record as long as the case notes clearly indicate that the records were retrieved from the Terrorist Analysis Group Known Standard Library.

6.1 Retention of Friction Ridge Recordings

The retention of records in the Terrorist Analysis Group Known Standard Library is at the discretion of the Major Case Coordinator.

6.1.1 Composite Records

Composite records will be generated from identified and verified prints from casework. For each print recording on a card, the card will list the lab number including relevant case record number where the print was identified and verified. The card will be filed under a Universal Control Number or other unique identifier.

6.1.2 Remaining Records

All remaining digital recordings within the Terrorist Analysis Group Known Standard Library have at least one unique number: Internment Serial Number, Universal Control Number, or legacy Integrated Automated Fingerprint System Identification number. Some records may have more than one of these numbers. The Universal Control Number will either be verified by Criminal Justice Information Services Division or verified and documented by Friction Ridge Discipline personnel on a printout of a record from the Integrated Automated Fingerprint Identification System or the Next Generation Identification System that is maintained in the library. If no Universal Control Number exists for the individual, the original cards or a copy is provided to the Criminal Justice Information Services Division, who will generate a Universal Control Number for those submissions that meet its criteria. The digital copies in the Terrorist Analysis Group Known Standard Library are filed by Universal Control Number. If there is no Universal Control Number, then they will be filed by legacy Integrated Automated Fingerprint Identification System number.

6.2 Requests for Copies of Records Retained in the Terrorist Analysis Group Known Standard Library

The Major Case Coordinator will ensure requests for copies of records retained in the Terrorist Analysis Group Known Standard Library will be answered and may be forwarded to Criminal Justice Information Services Division for dissemination.

7 Standards and Controls

Not applicable.

8 Sampling

Not applicable.

9 Calculations

Not applicable.

10 Measurement Uncertainty

Not applicable.

11 Limitations

Not applicable.

12 Safety

Not applicable.

13 References

ADAMS Workplace Quick Reference Guide, Foray™ Technologies, San Diego, CA.

American National Standard for Information Systems Data Format for the Interchange of Fingerprint, Facial & Scar Mark & Tattoo (SMT) Information, American National Standard Institute (ANSI), National Institute of Standards and Technology (NIST), U.S. Department of Commerce, ANSI/NIST-ITL 1-2007.

Approved Adobe Photoshop Actions, Friction Ridge Discipline. Federal Bureau of Investigation, Laboratory Division. Latest Revision.

FBI Friction Ridge Discipline Operations Manual, Standard Operating Procedures for Examining Friction Ridge Prints. Federal Bureau of Investigation, Laboratory Division. Latest Revision.

FBI Friction Ridge Discipline, System Security Plan for Latent Print Digital Imaging System. Federal Bureau of Investigation, Laboratory Division. Latest Revision.

FBI Friction Ridge Discipline Operations Manual, Standard Operating Procedures for the Next Generation Identification System. Federal Bureau of Investigation, Laboratory Division. Latest Revision.

Scientific Working Group on Friction Ridge Analysis, Study, and Technology, Standard for Friction Ridge Digital Imaging (Latent/Tenprint). Latest Revision.

| Rev. # | Date | History |
|--------|----------|--|
| 13 | 11/07/18 | Minor wording changes throughout document, removal of “-Latents group”, changed multiple instances of “examiner” to “personnel”, and clarified file name composition. Intentionally recorded print requirements further distinguished between standard and non-standard in document. Document specifies specific units and casework involved. Section 5.2, added number 3 and renumbered. Section 5.7.1, further clarified image deletion. Section 5.8.3, clarified initials. Section 6.1.1.2, removed approval requirement and duplicate retention requirement. Section 6.2, clarified responsibilities and added “if applicable”. Section 6.2.1, removed redundant phrase. Section 8, updated and clarified wording used and added systems storage notation. |
| 14 | 04/17/20 | Latent Print Units changed to Friction Ridge Discipline throughout document as well as other appropriate changes with similar terms. Minor wording, grammar, reorganization of material, and punctuation changes in document. Reorganized sections and renumbered and renamed as appropriate. Section 1, removed extraneous paragraph, clarified coverage of work, and changed affected personnel. Removed specific listing in Section 2 and updated for added personnel. Section 3.1, updated affected personnel, consolidated all capture sections and lessened requirement for file properties with added caveats. Section 3.4, removed specific filter type and added clarification on reverse color and position. Section 3.5, clarified expectations for printed images, modified Quantico network requirements to a more generalized statement. Section 3.6, generalized content and second bullet point, replaced direct capture requirement with direct upload requirement. Section 3.6.1, generalized reason for deletion requirement. Section 3.7 through Section 3.7.2, three sections were reorganized and further clarification on expectations added. Section 3.7.3, content broadened to include all digital media with caveats and restrictions added. Section 4.1.1, changed and clarified retention requirements. Section 4.2, Title changed to specify who is affected by requirements and added date(s) of processing requirement. Section 4.2.1, clarification added on retention. Section 6.2.2 (old), removed. Section 5, broaden sources and responsibility clarified. Section 6, composite records added. Section 6.1, removed designee. Added Section 6.1.1 and created new Section 6.1.2 with existing information. Section 13, updated. |

Approval

Redacted - Signatures on File

Friction Ridge Discipline
Technical Leader

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Date: 04/16/2020

Latent Print Operations
Unit Chief

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Date: 04/16/2020

Acting Latent Print Support
Unit Chief

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Date: 04/16/2020

Acting Scientific and
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Date: 04/16/2020

Evidence Management Unit
Chief

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Date: 04/16/2020

Operational Projects Unit
Chief

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Date: 04/16/2020

Standard Operating Procedures for Examining Friction Ridge Prints

1 Introduction

Friction ridge print examinations are conducted using a process known as Analysis, Comparison, and Evaluation, which includes an assessment of the quantity and quality of the information present.¹ The steps of Analysis, Comparison, and Evaluation are applied to friction ridge prints, as appropriate. The comparison and evaluation of two areas of friction ridge prints are based on the examination of ridge flow; ridge paths, including the location, direction, and spatial relationships of minutiae; and ridge structure and pores. The following are the fundamental principles for these examinations:

- The morphology of friction ridge skin is unique.
- The arrangement of friction ridges is persistent.
- During contact with a surface, the details of friction ridge skin may be transferred.
- A print that contains sufficient quality and quantity of friction ridge detail can be identified to, or excluded from, a source.²
- No predetermined number of friction ridge details is required to establish a conclusion.

Throughout all Friction Ridge Discipline level two documents and case records, the terms *Source Identification* and *Source Exclusion* are interchangeable with the terms *identification* and *exclusion*, respectively.

2 Scope

These procedures apply to all personnel who conduct friction ridge print Analysis, Comparison, and Evaluation examinations within the FBI Laboratory.

3 Factors Affecting Examinations

The quality and appearance of a print may be affected by various factors when a print is deposited. An examiner must consider these factors when determining the tolerance for variation in the appearance of friction ridge features. Failure to properly assess these factors may result in a misinterpretation of the data. These factors must be considered in all phases of Analysis, Comparison, and Evaluation, when applicable and available.

¹ SWGFAST Document #10 Standards for Examining Friction Ridge Impressions and Resulting Conclusions (Latent/Tenprint), Ver 2.0, Issue Date 03/13/2013.

² Source refers to the area of friction ridge skin.

3.1 Anatomical Aspects

- Possible areas of friction skin
- Additional friction ridge prints on the same item
- Condition of friction skin

3.2 Transfer Conditions

- Pressure applied during transfer
- Slippage or twisting
- How an item may be handled

3.3 Transfer Medium

- Eccrine
- Sebaceous
- Blood
- Paint
- Dirt
- Corrosives
- Oil/grease
- Other

3.4 Detection Method

- Visual
- Forensic light source
- Chemical
- Powder

3.5 Substrate

- Porous
- Non-porous
- Semi-porous
- Textured
- Adhesive

3.6 Environmental

- Protected
- Unprotected
- Wet (excessive)
- Hot (excessive)
- Dry (excessive)

3.7 Preservation

- Lifting
- Casting
- Photography
- Digital capture

4 Levels and Uses of Friction Ridge Print Detail for Examinations

Friction ridge print detail refers to the information present in a print. The information can be classified into three levels of detail. An examiner will assess the information to determine the quality and quantity of information detected in the print. This information must be considered in all phases of Analysis, Comparison, and Evaluation, when applicable and available.

4.1 Level One Detail

- Overall ridge flow
- General morphology (e.g., overall size)
- Used for pattern interpretation to determine anatomical source (i.e., finger, palm, foot, toe) and orientation
- Not used alone to identify

4.2 Level Two Detail

- Individual ridge path
- Presence of a ridge event
 - Type of ridge event (e.g., ending ridge, dividing ridge, or dot)
 - Direction of ridge event
 - Location of ridge event
 - Spatial relationship of ridge events
- Absence of ridge events (e.g., continuous ridge)
- Combination of ridge events
- Used in conjunction with level one detail to form a conclusion

4.3 Level Three Detail

- Structure of individual ridges (e.g., size, edge shapes)
- Relative pore position
- Other specific friction ridge skin morphology (e.g., ridge breaks)
- Used in conjunction with level one and level two detail to form a conclusion

4.4 Other Features Associated with Friction Ridge Prints (e.g., creases, scars, warts, paper cuts, blisters)

- May be permanent or temporary
- May exist as level one, two, and/or three detail
- May be used in conjunction with friction ridge detail to form a conclusion

Because the appearance of level three detail and/or other friction ridge print features (Section 4.3 and Section 4.4) are highly variable depending on deposition pressure and other factors, these details may be used to support a conclusion only when the corresponding area of the friction ridge print is reliable and with similar deposition pressure as the exemplar. If the details are significantly relied upon to reach a conclusion, the examiner must check all available known prints on file to determine whether the details utilized to support a conclusion are reliably and consistently reproduced and the details must be recorded.

5 Procedures for Friction Ridge Print Examinations (Analysis, Comparison, and Evaluation)

Friction ridge print examinations are conducted using Analysis, Comparison, and Evaluation, which is applicable to all friction ridge examinations (i.e., unknown to known, known to known, or unknown to unknown). Analysis, Comparison, and Evaluation is a process in which the examiner continually assesses the specificity and/or rarity of features and any similarity/dissimilarity between two prints. Throughout Analysis, Comparison, and Evaluation, the examiner may re-analyze the friction ridge print.

5.1 Analysis

Analysis is the primary examination of a friction ridge print by an examiner, in which the quality and quantity of information, including the specificity and/or rarity of features and their relationships, are assessed in addition to tolerance for variations in appearance.

A print is suitable for comparison when the examiner determines that sufficient reliable information may be present, such that an identification decision could be reached. A print is suitable for comparison when the observed information contains enough specificity and/or rarity that the examiner would not expect to see that same amount of information repeated in a different source.

If the print lacks sufficient reliable information such that an identification decision to any source would not be considered possible, the print is not suitable for comparison.

An examiner must conduct and record a thorough analysis on a friction ridge print(s) before he/she conducts comparisons using the print(s).

Note: While “suitable for comparison” is preferred, the term is synonymous with “claimed” which can be used as needed.

5.1.1 Analysis Procedure

The examiner observes the print and may use a magnifier, microscope, macroscope, digital imaging software, or other tools, when necessary. The examiner determines if the print is from

friction ridge skin and, if so, analyzes the print considering the information outlined in Sections 3 and 4.

If a print is suitable for comparison, the examiner will move to the next step in the process, comparison, as applicable.

5.1.2 Analysis Records

Sufficient level two detail to support a suitable for comparison decision must be recorded on an image of the print prior to conducting a comparison. If level three detail is a significant factor in deeming the print suitable for comparison, the level three detail relied upon to reach that decision must also be recorded. See Section 5.1.2.1 for exception for standard intentionally recorded prints.

5.1.2.1 Analysis Recording - Images

If the print is suitable for comparison, the examiner will orient the print in the correct anatomical position, if known, and indicate the type (e.g. fingerprint, palm print, toe print). Due to the nature of the record, orientation, type, and level two or three detail are not required for standard intentionally recorded prints (e.g., ten print card, fingerprint strip, major case prints). Non-standard intentionally recorded prints (e.g., single print on license or notary book) will require the orientation, type, and level two or three detail recorded.

5.1.2.2 Analysis Recording – Case Record

The case record must include the number and type of prints that are suitable for comparison for each item, as well as an indication of any items(s) for which there are no prints suitable for comparison. Unless otherwise noted in the case record, standard intentionally recorded prints are assumed to be suitable for comparison if used for a comparison.

The case record must also include a record of any friction ridge print not analyzed. The contributor will be notified that prints were not analyzed and are available for future requests as needed. With the exception of known records and unless otherwise noted in the case record, all suitable for comparison prints are assumed to be latent prints.

5.1.3 Change in Analysis

Throughout Analysis, Comparison, and Evaluation, the examiner may re-analyze the friction ridge print based on new friction ridge information (such as through consultation) or new interpretations of previous information.

5.1.3.1 Change in Analysis Disagreements for Not Reported Prints

If an examiner determines that a suitable for comparison print lacks sufficient reliable information such that an identification decision to any source would not be considered possible, and the print(s) has not been reported, the analysis decision can be changed with no approval or extra records required. The marked image will be retained in the case record.

No additional measures will be taken if an examiner changes the analysis of a print deemed not suitable for comparison.

If another examiner had made the original decision, the change will not be addressed by the FBI Laboratory Operations Manual, Practices for Resolution of Scientific or Technical Disagreement and the FBI Friction Ridge Discipline Quality Assurance Manual, Procedures for Disagreements in Technical Casework as the change would not fall under the conditions of those documents.

5.1.3.2 Change in Analysis Disagreements for Previously Reported Prints

If an examiner determines that a suitable for comparison print lacks sufficient reliable information such that an identification decision to any source would not be considered possible, and the print(s) has been previously reported, the examiner will do the following:

- For a suitable for comparison print(s) (or claimed print) that has been reported, expanded analysis documentation and supervisory approval is required (e.g., digital markups).
- For a print(s) that has been reported as of value, supervisory approval is required.

In addition, if the print(s) had been previously reported by another examiner currently employed in the FBI Friction Ridge Discipline, changes in analysis will be handled as follows:

- Uncompared print(s) and print(s) previously reported as inconclusive due to the latent will require a discussion with the original examiner. The discussion and conclusion will be noted in the case record. The previous report will be amended as needed. The change will not be addressed by the FBI Laboratory Operations Manual Practices for Resolution of Scientific or Technical Disagreement and the FBI Friction Ridge Discipline Quality Assurance Manual, Procedures for Disagreement in Technical Casework as the change would not fall under the conditions of those documents.
- Prints with any other reported conclusion (e.g., identified, excluded, inconclusive due to the known, or automated search results) will require disagreement resolution with the original examiner. The previous report will be amended or supplemented as needed.

If the original examiner is no longer employed in the FBI Friction Ridge Discipline, no disagreement discussions will occur. The previous report will be amended or supplemented as needed.

If an examiner determines that a not suitable for comparison print should now be suitable for comparison, no additional measures will be taken. The change will not follow the FBI Laboratory Operations Manual Practices for Resolution of Scientific or Technical Disagreement and the FBI Friction Ridge Discipline Quality Assurance Manual, Procedures for Disagreement in Technical Casework as the change would not fall under the conditions of those documents.

5.1.4 Intentionally Recorded Prints

See Section 5.1.2 through Section 5.1.2.2 for analysis record requirements for intentionally recorded prints.

An examiner using a known exemplar(s) for examinations must record which prints were used. Examples of acknowledgement include initialing a copy of the known exemplar(s), associating a secure electronic signature with the exemplar, or assigning a unique identifier to each card and recording the appropriate identifier in the case record.

For acceptance requirements of non-original intentionally recorded prints, refer to the FBI Friction Ridge Discipline Quality Assurance Manual, Procedures for Case Acceptance.

5.2 Comparison

Comparison is the side-by-side observation of suitable for comparison friction ridge prints to determine whether the information observed during analysis is in agreement or disagreement between two prints. When determining if features correspond, an examiner considers variation in the appearance of the friction ridge prints that may be attributed to the factors listed in Section 3. Throughout the comparison process, the examiner may re-analyze the prints being compared. (See Section 5.1.3)

5.2.1 Comparison Procedure

1. The examiner compares the corresponding area between two friction ridge prints. If a suitable for comparison print is determined to be an impression, all appropriate areas of the available known prints must be compared, unless otherwise noted. When comparing a latent print to a known print, the examiner will begin the comparison process with the latent print. Evaluation decisions are clarified in Section 5.3.

2. If appropriate, the examiner determines if a sufficient amount of level one detail is in disagreement for exclusion.

3. If a print cannot be excluded based on level one detail, additional detail must be compared.

4. The examiner selects a target group in a friction ridge print and searches for it in the comparable area of the second friction ridge print. If the initial target group is not found, alternative target groups may be selected.

5. If similarity with the target group is found, the examiner continues comparing ridges in sequence until a sufficient amount of agreement of friction ridge detail allows the examiner to support an identification conclusion. If similarity with the target group is not found, the examiner continues comparing friction ridge detail until a sufficient amount of disagreement of friction ridge detail allows the examiner to support an exclusion conclusion. 6. If after comparison of all relevant comparable areas, neither sufficient agreement nor sufficient disagreement of friction ridge details can be observed, the examiner may form an inconclusive conclusion.

6. During comparison, the examiner may change the original analysis conclusion. If a change is made, the examiner must clearly record the change in the case record. (See Section 5.1.3.)

5.3 Evaluation

Evaluation is the formation of a conclusion based on the examiner's observations, assessments, and records generated during the analysis and comparison of the friction ridge prints. The observation and assessment refers to the examiner's interpretation of the information found to be either in agreement or disagreement between two prints in order to come to a conclusion. The conclusion is supported by the examiner's ability to assess the specificity and/or rarity of information present within the print. The possible conclusions are as follows:

- Identification
- Exclusion
- Inconclusive
 - Known
 - Latent (also applies to non-standard intentionally recorded prints)

5.3.1 Identification

Identification is an examiner's conclusion that two friction ridge prints originated from the same source. The conclusion is an examiner's decision that the observed friction ridge skin features are in sufficient correspondence such that the examiner would not expect to see the same arrangement of features repeated in a print that came from a different source and has found insufficient friction ridge skin features in disagreement to conclude that the prints came from different sources.

The basis for an identification conclusion is an examiner's decision that the observed corresponding friction ridge skin features provide extremely strong support for the proposition that the two prints came from the same source and extremely weak support for the proposition that the two prints came from different sources.

An identification is the statement of an examiner's opinion (an inductive inference³) that the probability that the two prints were made by different sources is so small that it is negligible. An identification is not based upon a statistically-derived or verified measurement or actual comparison to all other friction ridge print features. While an identification to the absolute exclusion of all others is not supported by research, an identification conclusion is supported by:

- the biological premise that friction ridge skin is persistent and unique,⁴
- population studies that have assessed the frequency of features,⁵ and
- statistical models, which have demonstrated that as more reliable features are found in agreement, it becomes less likely to find that same arrangement of features in a print from a different source.⁶

Level three detail may be used to support a conclusion only when the corresponding areas of the prints are reliable.

5.3.1.1 Recording an Identification

If the print is identified to a known source, the annotated image will indicate that an identification was effected, correct anatomical source designation (e.g., finger #, left/right palm/foot), and last name or unique identifier (e.g., Universal Control Number (UCN)) of the individual. Additional information may be needed if the last name is not unique to the case record.

The use of level three detail to effect a conclusion must be recorded in the case record.

If a latent to latent comparison results in an identification, the conclusion must be recorded on both images.

5.3.2 Exclusion

Exclusion is an examiner's conclusion that two friction ridge prints did not originate from the same source. The basis for an exclusion is an examiner's decision that the observed friction ridge skin features are in sufficient disagreement and provide extremely strong support for the

³ "By the process of induction or inference, predictions about new situations are inferred or induced from the existing body of knowledge. In other words, an inference is a generalization, but one that is made in a logical and scientifically defensible manner." Oxford Dictionary of Forensic Science 130 (2012).

⁴ ---- (2011). National Institute of Justice. The Fingerprint Sourcebook. (www.nij.gov/pubs-sum/225320.htm) Chap. 2-3; Wertheim, K., & Maceo, A. (2002). The Critical Stage of Friction Ridge and Pattern Formation. *Journal of Forensic Identification* 52(1): 35-85

⁵ Gutierrez, E.; Galera, V.; Martinez, J. M.; and Alonso, C. (2007). Biological Variability of the Minutiae in the Fingerprints of a Sample of the Spanish Population. *Forensic Science International* 172:98-105; Gutierrez-Redomero, E.; Alonso-Rodriguez, C.; Hernandez-Hurtado, L. E.; and Rodriguez-Villalba, J. L. (2011). Distribution of the Minutiae in the Fingerprints of a Sample of the Spanish Population. *Forensic Science International* 208:79-90.

⁶ Neumann, C. et al (2012). Quantifying the weight of evidence from a forensic fingerprint comparison: a new paradigm. *Journal of the Royal Statistical Society*, Vol. 175, pp. 371-415.

proposition that the two prints came from different sources and extremely weak or no support for the proposition that the two prints came from the same source.

5.3.3 Inconclusive

Inconclusive is an examiner's conclusion that there is insufficient quantity and/or clarity of corresponding friction ridge skin features between two prints such that the examiner is unable to identify or exclude the two prints as originating from the same source. The basis for an inconclusive conclusion is an examiner's decision that an identification or exclusion cannot be made due to insufficient information in either of the two prints examined.

5.3.3.1 Known Inconclusive

A known inconclusive conclusion can be rendered due to insufficient information in the known print. For example, if the print to be compared is from the tip or lower joint of a finger and the corresponding area is not fully captured on the available exemplar(s), or the corresponding area is unusable (e.g., due to distortion), then a known inconclusive conclusion would be reached. Additional recordings from the compared individual may allow for a conclusive decision to be reached.

A known inconclusive conclusion is not used if the corresponding exemplar(s) is not available. For example, if the print to be compared is a palm print and no known palm prints are available for an individual, a known inconclusive conclusion is not appropriate. Instead, the examiner will record the absence of known palm prints in the case record.

If the print to be compared is an impression, the comparison conclusion will be specific to the type of known prints available (e.g., one latent impression is not a fingerprint of JOHN DOE. No palm prints are available for DOE.).

A known inconclusive conclusion will be denoted in the case record as "inconclusive" with no additional explanation.

5.3.3.2 Latent Inconclusive

A latent inconclusive conclusion can be rendered due to insufficient information in the latent print or a non-standard intentionally recorded print. This conclusion is appropriate if the examiner is unable to identify or exclude the prints as having come from the same source and the following two conditions are met:

- additional recordings from the compared individual are not expected to allow for a conclusive decision to be reached AND
- The latent print may still contain sufficient reliable information such that an identification decision to another individual could be reached.

A latent inconclusive decision is not appropriate if it is determined that the latent print is no longer suitable for comparison (i.e., no longer contains sufficient information for an identification to any individual). Instead, the examiner will record a change in the analysis of the print as written in Sections 5.1.3 through 5.1.3.2.

If the examiner reaches a latent inconclusive decision, he/she will be required to add additional explanation (e.g., latent inconclusive, inconclusive due to latent).

5.3.4 Recording Evaluations

The case notes must contain a record of the evaluation conclusion reached for all prints. Case notes will indicate if the prints are not compared (e.g., latent palm prints in the case but no known palm prints are available).

If a latent to latent comparison is requested, the examiner must clearly record which prints were compared and whether the prints were identified or if no identifications were effected.

The results of known to known comparisons must be captured in the case notes and no Analysis, Comparison, and Evaluation marking is necessary on the original or copies of the exemplar. Case notes will include the conclusion.

5.4 Information to Support Analysis, Comparison, and Evaluation Conclusion(s)

If the data relied upon to support the evaluation conclusion are different from the information initially recorded during analysis, the examiner must record the new information. The case record must clearly indicate at what stage the recorded information was observed (e.g., analysis or comparison). The examiner may need to use multiple images to record his/her Analysis, Comparison, and Evaluation process, with each image clearly marked with the stage(s) of information (e.g., writing “analysis” on a second analysis image or adding “comparison” to asset information in a digital image). If multiple images are used, the examiner must compare the data observed in the initial analysis to the data relied upon to support the final analysis and evaluation conclusion.

5.4.1 Records - Images

A copy of all latent print images captured by FBI personnel must be retained, with the exception of images deemed “test” or “exploratory” per the FBI Friction Ridge Discipline, Standard Operating Procedures for Digital Images. If produced, a negative will be retained along with any required digital images. All annotated images must be retained, regardless of whether the print was determined to be suitable for comparison. If used for comparison, a legible reproduction of the known exemplar(s) must be retained in the case record.

6 Verification and Blind Verification

Refer to the FBI Friction Ridge Discipline Quality Assurance Manual, Procedures for Verification and Blind Verification for definitions and specific procedures and their application.

7 Supervisor Review

A Supervisor may deem it necessary to review the casework of any examiner in his/her unit for all or part of a case that has not yet been reported. These examinations are referred to as a Supervisor review and are recorded in the case record. The record will show what was reviewed in addition to the Supervisor's name and the date(s) of the review. The Supervisor must retain any additional records he/she generates in the case record.

8 Consultation

A consultation is a significant interaction between examiners regarding one or more prints in question.

An interaction is considered significant when the consultant examiner conducts an analysis or comparison of the print(s). The commonality of the examples below is that they include, at a minimum, an analysis of the print(s), and may also include a comparison and evaluation.

Examples of significant interactions that rise to the level of consultation include:

- Determination of suitability for comparison in analysis
- Presence of significant distortions impacting the analysis or comparison
- Presence of specific features during the analysis or comparison
- Whether an examination is complex or non-complex

Discussions falling below the level of a significant interaction usually involve minimal (or no) analysis. In addition, they typically have less potential to impact the key decision stages of Analysis, Comparison, and Evaluation and are often related to case efficiency, strategy for workflow, or case management. Examples of discussions that do not rise to the level of consultation include:

- Suitability for Next Generation Identification system and/or its parameters
- Administrative decisions such as triage (e.g., prioritizing prints for examination)
- Searching efficiency (search smart clues)
- Processing choices
- Anatomical origin
- Orientation

Only consultations must be recorded in the case record. The case record will clearly describe what the examiner consulted on as well as the consultant's name and the date of consultation.

Any new examination records created as a result of consultation must be retained in the case record. Discussions or other communications that do not reach the level of a consultation do not need to be recorded.⁶

9 Complex Analysis or Conclusion

When dissimilarities or factors influencing the quality of a latent print are present, and their presence could interfere with the proper interpretation of the print, the resulting analysis or evaluation conclusion may be considered complex.

Some factors that may result in a complex analysis or evaluation conclusion include irregular substrate, excessive deposition and/or lateral pressure, and limited level two detail. The factors leading to a complex analysis or conclusion and an explanation of any differences will be recorded and supported in the case record.

10 Limitations

The presence of a friction ridge print on an item of evidence indicates contact was made between the source and the item. The presence of a friction ridge print alone does not necessarily indicate the significance of the contact or the time frame during which the contact occurred.

Due to a variety of factors, the recovery of friction ridge prints on items of evidence is not always successful. A lack of friction ridge prints on an item or the exclusion of a friction ridge print from a given source does not necessarily mean that the given source did not come into contact with the item.

See FBI Friction Ridge Discipline Quality Assurance Manual, FBI Approved Standards for Scientific Testimony and Report Language for the Friction Ridge Discipline, Latest Revision.

11 Equipment/Materials/Reagents

Magnifiers

Ridge Counters (or dissecting needles)

Marking Pens

Microscopes/Macrosopes

⁶ SWGFAST Document #21 Standards for Consultation (Latent/Tenprint) DRAFT FOR COMMENT, Ver 1.0, Issue Date 03/14/2013.

Digital Imaging Systems

12 Calculations

Not applicable.

13 Measurement Uncertainty

Not applicable.

14 Standards and Controls

Not applicable.

15 Sampling

Not applicable.

16 Safety

Not applicable.

17 References

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FBI Friction Ridge Discipline Quality Assurance Manual, Procedures for Verification and Blind Verification, Federal Bureau of Investigation, Laboratory Division. Latest Revision.

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Scientific Working Group for Friction Ridge Analysis, Study, and Technology. Document #7
Standard for a Quality Assurance Program in Friction Ridge Examinations (Latent/Tenprint),
Latest Revision.

Scientific Working Group for Friction Ridge Analysis, Study, and Technology. Document #8
Standard for the Documentation of Analysis, Comparison, Evaluation, and Verification (ACE-V)
(Latent), Latest Revision.

Scientific Working Group for Friction Ridge Analysis, Study, and Technology. Document #10
Standards for Examining Friction Ridge Impressions and Resulting Conclusions
(Latent/Tenprint), Latest Revision.

Scientific Working Group for Friction Ridge Analysis, Study, and Technology. Document #19
Standard Terminology of Friction Ridge Examination (Latent/Tenprint), Latest Revision.

Scientific Working Group for Friction Ridge Analysis, Study, and Technology. Document #21
Standards for Consultation (Latent/Tenprint) DRAFT FOR COMMENT, Latest Revision.

Ulery, B.T., Hicklin, R.A., Kiebusinski, G.I., Roberts, M.A., and Buscaglia, J. "Understanding
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| Rev. # | Date | History |
|--------|----------|---|
| 11 | 08/21/19 | Minor wording modifications throughout document. Section 5, Heading changed. Section 8.3.3.2, parentheses added. Section 10, Remove checks to Training documents and broaden Supervisor Check to unit. |
| 12 | 04/17/20 | Latent Print Units changed to Friction Ridge Discipline throughout document as well as other appropriate changes with similar terms. Minor wording, grammar, reorganization of material, and punctuation changes in document. Reorganized sections and renumbered and renamed as appropriate. Section 5.1.2.2, added clarification. Section 5.2.1, updated to better mirror process. Updated Section 5.3.1, Section 5.3.2, and Section 5.3.3 to correspond with updated Department of Justice document. Section 5.3.1.1, generalized to unique identifier. Section 5.4, clarification added. Section 6, removed last paragraph. Section 8, added example. |

Approval

Redacted - Signatures on File

Friction Ridge Discipline
Technical Leader

-

Date: 04/16/2020

Latent Print Operations
Unit Chief

-

Date: 04/16/2020

Acting Latent Print Support
Unit Chief

-

Date: 04/16/2020

Acting Scientific and
Biometrics Analysis Unit Chief

-

Date: 04/16/2020

Standard Operating Procedures for Latent Print Processing with Alternate Black Powder

1 Scope

Alternate Black Powder is used by latent print personnel to develop latent prints on adhesive surfaces.

2 Equipment/Materials/Reagents

Balance

Beakers or graduated cylinders

Camel hair brush or other similar small brush

Petri dish or other container

Spatula

Squirt bottles

Water

Lightning[®] Black Powder

Liqui-Nox[®]

3 Standards and Controls

Not applicable.

4 Sampling or Sample Selection

Not applicable.

5 Procedures

5.1 Solution Preparation

- a) Liqui-Nox[®] stock solution
 - Combine Liqui-Nox[®] and water in equal amounts and mix.
- b) Alternate Black Powder working solution
 - Place Lightning[®] Black Powder in petri dish or other suitable container.
 - Add Liqui-Nox[®] stock solution and stir using a brush until the consistency of shaving cream is achieved.

5.2 Application

- a) Paint the Alternate Black Powder working solution onto the adhesive surface with a camel hair brush or other similar small brush.
- b) Let sit for a minimum of 30 seconds.
- c) Rinse with a slow stream of water.
- d) Allow to dry.
- e) For digital capture and photography, see FBI Latent Print Units Processing Manual Preamble.

5.3 Storage

- a) Liqui-Nox[®] stock solution may be stored in any type of laboratory accepted receptacle.
- b) Alternate Black Powder working solution may be stored in the mixing container provided the reagent checks are properly conducted.

5.4 Shelf Life

Liqui-Nox[®] stock solution and Alternate Black Powder working solution have an indefinite shelf life provided that the reagent check is satisfactory.

5.5 Reagent Checks

See FBI Latent Print Units Processing Manual, Preamble.

6 Calculations

Not applicable.

7 Measurement Uncertainty

Not applicable.

8 Limitations

Not applicable.

9 Safety

See FBI Laboratory Safety Manual for appropriate information.

10 References

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FBI Laboratory Safety Manual, Federal Bureau of Investigation, Laboratory Division. Latest Revision.

FBI Latent Print Units Processing Manual, Preamble, Federal Bureau of Investigation, Laboratory Division. Latest Revision.

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| Rev. # | Issue Date | History |
|--------|------------|---|
| 0 | 01/13/14 | Original document issued. Derived from Discontinued Latent Print Operations Manual, Standard Operating Procedures for Processes Used to Develop Latent Prints. The original LPU Processing Manual consisted of a single document with a preamble and procedures for all processes. The current document separates each into its own separate document. |
| 1 | 10/02/17 | Specific section numbers referenced in Preamble removed throughout document. Section 1, latent print personnel added. Section 4 removed and remaining renumbered. Titles for Section 4 and Section 7 modified. Section 5.3 and Section 5.4, allows for storage of working solution. Section 9, generalized. Updated for Biometrics Analysis Unit. Reference modified. |

Approval

Redacted - Signatures on File

Standard Operating Procedures for Examining Unknown Deceased Friction Ridge Prints

1 Scope

These procedures are intended for use by personnel who examine captured friction ridge prints of unknown deceased individuals. Postmortem prints obtained from human remains may be compared with antemortem exemplars and/or searched in the Next Generation Identification System for the purpose of verifying or establishing identity.

2 Equipment/Materials/Reagents

Magnifiers

Ridge Counters (or dissecting needles)

Microscopes/Macroscopes

Digital Imaging Systems

Next Generation Identification System workstation (equipment provided and maintained by the Criminal Justice Information Services Division)

3 Standards and Controls

Not applicable.

4 Sampling or Sample Selection

Not applicable.

5 Procedure

5.1 Processing Friction Ridge Skin in Laboratory

The individual conducting examinations will refer to the FBI Latent Print Units Processing Manual, Standard Operating Procedures for Processing Human Remains for techniques to acquire friction ridge prints, as needed.

When processing submitted hands, fingers, feet or any human remains containing friction ridge skin, the following procedures must be followed:

- Record the totality of items received (e.g., left hand with all fingers attached or right hand with digits #1 and #3 missing and two disassociated fingers).
- Record all attempted activities or processing techniques used to obtain friction ridge prints (even those that were not successful) and record the results from those attempts.
- Record appropriate information on the physical print record(s) (per the FBI Latent Print Units Processing Manual, Standard Operating Procedures for Processing Human Remains) or have this information associated with digital print records after capture.
- Initially, the examiner may record as few friction ridge prints as necessary from the remains and attempt to identify. If the individual is not identified, an attempt must be made to record all friction ridge skin detail on the hands, to include palms. It is at the examiner's discretion whether to record all detail ahead of time to attempt identification or to record the minimum necessary to attempt identification.
- The examiner may print the feet as dictated by the circumstances. These will be handled similarly as described for friction ridge prints from the hand listed above.
- Place physical postmortem print record(s) obtained directly from human remains in a biohazard storage bag.
- Digital copies of all recorded friction ridge prints deemed suitable for capture must be retained in the case record. Personnel will refer to the FBI Latent Print Units Operations Manual, Standard Operating Procedures for Digital Images for guidance.
- After digital copies are made, the examiner will not retain the physical print records obtained directly from human remains and will either destroy these records or return them to the contributor as secondary evidence. If the examiner chooses to dispose of the physical print and/or records, they must document the disposition in the case notes.

5.2 Examination of Captured or Submitted Postmortem Prints

All physical postmortem records obtained directly from human remains will be treated as biohazard material.

A digital copy of all captured and/or submitted friction ridge prints deemed suitable for capture must be retained in the case record. Personnel will refer to the FBI Latent Print Units Operations Manual, Standard Operating Procedures for Digital Images for guidance.

If an identification is effected to an antemortem or non-duplicate postmortem record, a legible reproduction of the record(s) used to effect the identification must be retained in the case record.

When conducting examinations on non-original submitted unknown deceased prints, personnel will proceed with the expectation that the information provided is a true and accurate representation of the original, unless otherwise indicated.

5.2.1 Associated and Disassociated Portions or Records

If intact remains are received or the friction ridge print records are contained on a single media (e.g., a fingerprint card or a single digital image), they are assumed to be associated to a single individual unless proven otherwise. In the event that records are contained across multiple media (e.g., multiple cards or multiple digital images) or non-intact human remains are received, the recordings or remains are considered disassociated unless the friction ridge prints were captured in the Laboratory, remains were separated in the Laboratory, and/or documentation exists to confirm the submitted records or remains are associated. Wherever possible, the examiner should inter-compare records to ensure prints across multiple media are connected.

An attempt must be made to identify all disassociated portions or records. If multiple disassociated portions or records are examined, an attempt must be made to identify at least one print from each portion or record. Some examples include:

- If both hands are received, are separated from the torso, and there is no confirmation that the hands originated from a single individual, the portions are disassociated and an attempt must be made to identify at least one finger or the palm from each hand.
- If multiple fingers are submitted individually and there is confirmation that the fingers originated from a single individual, the portions are associated and an attempt must be made to identify at least one of the submitted fingers.
- If a single fingerprint card with ten fingers recorded is submitted digitally, the prints are connected and an attempt must be made to identify at least one of the recorded prints.
- If a disc containing multiple images connected with a single individual is submitted, the images are associated and an attempt must be made to identify at least one of the captured prints among the associated images.
- If an email containing multiple images is received and there is no confirmation that the images originated from a single individual, the images are disassociated and an attempt must be made to identify at least one print in each image.

5.2.2 Assessment and Examination of Records

All unknown deceased prints are treated as standard known records per Section 8.1.4 in the FBI Latent Print Units Operations Manual, Standard Operating Procedures for Examining Friction Ridge Prints.

For cases where no potential antemortem identity is provided by the contributor, the examiner

should assess for Next Generation Identification System quality prints only, and the case record will show which prints were searched in the Next Generation Identification System.

If manual comparisons against an antemortem record are required, the prints will be examined per the applicable sections in the FBI Latent Print Units Operations Manual, Standard Operating Procedures for Examining Friction Ridge Prints.

5.3 Searching Captured or Submitted Postmortem Prints

The examiner will refer to the FBI Latent Print Units Operations Manual, Standard Operating Procedures for the Next Generation Identification System for guidance on conducting searches. Reference the following sections for specific procedures for all prints to be searched in the Next Generation Identification System.

When the captured or submitted postmortem prints are not identified and the unknown deceased is estimated to be born before 1983, the examiner will submit a copy of the record to the Criminal Justice Information Services Division to be searched in the manual file. The examiner can only submit the record if it contains either nine or ten captured fingerprints (so a pattern classification can be determined). Any record not meeting these requirements will not be sent, however exceptions may be granted by the Next Generation Identification System Program Manager.

5.3.1 Ten Print Record Searches

The examiner may conduct a Known search of the recordings in the Next Generation Identification System criminal and civil files and the Special Population Cognizant file, when appropriate.

If an antemortem record is identified, the verification process will be completed and the examiner will cease searches.

If a postmortem record from the Criminal Justice Information Services Division files is identified, the examiner will do the following:

- If the postmortem record from the Criminal Justice Information Services Division files is an exact copy of the captured or submitted record, the examiner will record the match in his/her case notes and no verification is required. Searches will continue.
- If the postmortem record from the Criminal Justice Information Services Division files is a different recording of the same individual recorded on the captured or submitted record, the prints will be identified and the verification process will be completed. Searches will continue.

5.3.2 Searches of a Single Friction Ridge Print(s)

If no identification is effected to an antemortem record, the examiner will conduct searches of

the single friction ridge print(s) as follows with all Next Generation Identification System quality individual print recordings until all such recordings are searched or an identification is effected with antemortem prints.

- Both the criminal and civil files will be searched. Other files may be searched as the case warrants.
- The examiner will search against all ten fingers for each fingerprint search.
- In the case of multiple recordings of the same finger, the examiner will ensure all areas of the end joint of the finger are searched within the system.
- Palm prints, if available, will be searched.
- Captured or submitted postmortem prints searched as single friction ridge prints will not be added to the Unsolved Latent File. Exceptions may be granted by the Next Generation Identification System Program Manager.

If an antemortem print is identified, the examiner will do the following:

- The examiner will identify the print in the Next Generation Identification System and retain the screenshot.
- If the submitted recordings are associated, only 1 finger/palm needs to be identified, the verification process will be completed, and the examiner will cease searches.
- If the submitted recordings are disassociated, all portions will be identified, the verification process will be completed, and the examiner will cease searches.
- Any outstanding searches will be addressed as written in the FBI Latent Print Units Operations Manual, Standard Operating Procedures for the Next Generation Identification System.

If a postmortem print is identified, the examiner will do the following:

- If the postmortem record is from the Criminal Justice Information Services Division files and is an exact copy of the captured or submitted record, the examiner will record the match in his/her case notes and no verification is required. The remaining candidates will be compared and searches will continue.
- The first print that is identified to a non-duplicate record must be marked as identified in the Next Generation Identification System and the screenshot retained. The verification process will be completed for the identification. Comparisons will continue until the required number of unique candidates are addressed and searches will continue.
- For additional identifications to the same Universal Control Number, the examiner may choose “No Decision” or leave the result blank so the search can be closed. The remaining candidates will be compared as normal and searches will continue.
 - If the examiner chooses instead to identify the Universal Control Number, he/she must retain the Next Generation Identification System screenshot. Additional verifications are not necessary. The remaining candidates must still be compared.

5.3.3 Searching Macerated or Desiccated Recorded Prints

In some cases, the friction skin will expand or shrink to a point that the abnormal size of the recorded prints will affect the search. Gloved skin is typically larger than the normal size while charred skin is typically smaller. In these instances, when a print is searched as-is and no identification is effected, the examiner will need to use the Next Generation Identification System ridge counting tool as described in the FBI Latent Print Units Operations Manual, Procedures for the Next Generation Identification System.

5.3.4 Sharing Unknown Deceased Prints

Captured or submitted postmortem records may be shared with other agencies, through the Next Generation Identification System Program Manager or designee, as applicable. The examiner will refer to the FBI Latent Print Units Operations Manual, Standard Operating Procedures for the Next Generation Identification System for guidance.

6 Dover Mortuary, Incidents, and Criminal Justice Information Services Division Assistance

Examiners conducting exams for Dover Mortuary will follow procedures and documentation requirements established for and by the Dover Mortuary and those relevant paragraphs documented in this standard and the FBI Latent Print Units Operations Manual, Standard Operating Procedures for Examining Friction Ridge Prints and the Next Generation Identification System as well as the FBI Latent Print Units Processing Manual, Standard Operating Procedures for Processing Human Remains. No FBI Laboratory numbers are assigned for Dover cases and no FBI Laboratory reports are generated. All resulting records are provided to the Department of Defense Office of the Armed Forces Medical Examiner System.

All incidents overseen by the Major Incident Management Program Manager will follow procedures and documentation guidelines established by the requesting agency and those relevant paragraphs documented in this standard as well as the relevant paragraphs in the FBI Latent Print Units Operations Manual, Standard Operating Procedures for Examining Friction Ridge Prints and the FBI Latent Print Units Processing Manual, Standard Operating Procedures for Processing Human Remains. No FBI Laboratory numbers are assigned for major incidents and no FBI Laboratory reports are generated. The Major Incident Management Program Manager will produce a closure memorandum listing the results of all FBI Laboratory friction ridge print examinations resulting from the incident, unless those results have been previously reported in writing. In instances where the results have been previously reported in writing, the closure memo will inform the requesting agency that examinations are complete. Copies of any associated records will be retained by the Major Incident Management Program Manager. The Major Incident Management Program Manager will maintain a complete record of each major incident.

Examiners conducting individual fingerprint searches of unknown deceased individuals for the Criminal Justice Information Services Division Special Processing Center will follow procedures and documentation requirements established for and by the Criminal Justice Information Services Division Special Processing Center and those relevant paragraphs documented in this standard and the FBI Latent Print Units Operations Manual, Standard Operating Procedures for Examining Friction Ridge Prints and the Next Generation Identification System. No FBI Laboratory numbers are assigned for the Criminal Justice Information Services Division Special Processing Center cases and no FBI Laboratory reports are generated. All results, including the identity of the examiner conducting the examinations, are provided to the Criminal Justice Information Services Division Special Processing Center for dissemination and supporting records retained.

7 National Institute of Justice's National Missing and Unidentified Persons System

The National Institute of Justice's National Missing and Unidentified Persons System is a national centralized repository and resource center for missing persons and unidentified decedent records. The National Institute of Justice's National Missing and Unidentified Persons System maintains a database of the unknown deceased fingerprint records submitted from medical examiners and coroners across the United States. To date, the National Institute of Justice's National Missing and Unidentified Persons System does not have access to search any fingerprint databases, or the ability to submit fingerprint records to Criminal Justice Information Services Division. In an effort to help identify these unknown deceased individuals, a modified process is employed to search the prints against the Next Generation Identification System and provide positive results to the contributors. Any identification details will be provided to the agency who contributed the records to the National Institute of Justice's National Missing and Unidentified Persons System.

When conducting examinations on non-original submitted unknown deceased prints, personnel will proceed with the expectation that the information provided is a true and accurate representation of the original, unless otherwise indicated.

7.1 Case Receipt and Examinations

7.1.1 The Major Incident Management Program Manager or designee will facilitate the receipt of all cases from the National Institute of Justice's National Missing and Unidentified Persons System. No FBI Laboratory numbers will be assigned for the National Institute of Justice's National Missing and Unidentified Persons System cases and no FBI Laboratory reports will be generated, except as described in 7.2.2. Searches in the Next Generation Identification System will be conducted under a specific Latent Case Number designated by the Major Incident Management Program Manager.

7.1.2 The examiner will review the case images, encode relevant Next Generation Identification System suitable prints for searching, and search the prints per the relevant sections

above. The encodings within the Next Generation Identification System will serve as the examiner's analysis markings and, due to the nature of the examination, written analysis records are not required.

7.1.3 Exclusions or inconclusive decisions will be appropriately recorded in the Next Generation Identification System only. Nothing further will be done with the record, and National Institute of Justice's National Missing and Unidentified Persons System will be notified that no identification resulted from the automated searches.

7.1.4 When an identification decision is reached, the result will be recorded in the Next Generation Identification System and a copy of the marked minutia will be retained in the Latent Print Digital Imaging System.

7.1.5 All identified prints will be verified. Records for the verification will be retained in the Latent Print Digital Imaging System. No results will be reported without the successful completion of the required quality step(s).

7.1.6 A record of requests will be serialized in Sentinel annually and will include information needed to locate associated records in the Next Generation Identification System.

7.2 Reporting Identifications to Contributors

7.2.1 The National Institute of Justice's National Missing and Unidentified Persons System database will be used to identify the original contributor. The National Institute of Justice's National Missing and Unidentified Persons System is only notified when an identification is made, and that the original contributor is notified of the identification details. A record of the notification will be retained in the Latent Print Digital Imaging System.

7.2.2 If the contributor requests an official report, he/she will notify the Major Incident Management Program Manager or designee. An incoming communication will be required from the contributor and the examiner will follow all appropriate Laboratory practices and unit procedures when answering the request.

8 Calculations

Not applicable.

9 Measurement Uncertainty

Not applicable.

10 Limitations

Not applicable.

11 Safety

Not applicable

12 References

FBI Laboratory Quality Assurance Manual. Federal Bureau of Investigation, Laboratory Division. Latest Revision.

FBI Laboratory Safety Manual. Federal Bureau of Investigation, Laboratory Division. Latest Revision.

FBI Latent Print Units Operations Manual, Standard Operating Procedures for Digital Images. Federal Bureau of Investigation, Laboratory Division. Latest Revision..

FBI Latent Print Units Operations Manual, Standard Operating Procedures for Examining Friction Ridge Prints. Federal Bureau of Investigation, Laboratory Division. Latest Revision..

FBI Latent Print Units Operations Manual, Standard Operating Procedures for the Next Generation Identification System. Federal Bureau of Investigation, Laboratory Division. Latest Revision..

FBI Latent Print Unit Processing Manual, Standard Operating Procedures for Processing Human Remains. Federal Bureau of Investigation, Laboratory Division. Latest Revision..

FBI Latent Print Unit Quality Assurance Manual, Procedures for Case Acceptance. Federal Bureau of Investigation, Laboratory Division. Latest Revision..

Uhle, A.J. (2010). Fingerprints and Human Identification. In D. Senn and P. Stimson (Eds.), Forensic Dentistry, Second Edition (pp. 79-101). Boca Raton: CRC Press.

| Rev. # | Date | History |
|--------|----------|--|
| 6 | 12/16/16 | Title changed. Document split into two separate documents – one for the LOM for Examining Unknown Deceased Friction Ridge Prints and other to the LPU Processing Manual under Processing Human Remains. All information was updated in current version. Appendix A, updated one block from “Document” to “Record”. |
| 7 | 02/07/18 | Abbreviations removed throughout as well as minor wording, grammar, and punctuation changes. Sections 7 through 7.2.2 moved from the FBI Latent Print Unit, Practices for Case Acceptance. Section 5.1 through Section 5.3.4, updated, clarified and reorganized. Appendix A removed. |

Approval

Redacted - Signatures on File

Latent Print
Technical Leader

Date: 02/05/2018

Latent Print Operations
Unit Chief

Date: 02/05/2018

Latent Print Support
Unit Chief

Date: 02/05/2018

Biometrics Analysis
Unit Chief

Date: 02/05/2018

QA Approval

Quality Manager

Date: 02/05/2018

Standard Operating Procedures for Latent Print Processing with Amido Black (Methanol Base)

1 Scope

Amido Black (methanol base) is used by latent print personnel to develop latent prints and enhance visible prints that have been deposited in blood.

2 Equipment/Materials/Reagents

Beakers or graduated cylinders

Balance

Spatula

Distilled water

Squirt bottles, sprayers, brushes, or glass trays

Glass bottles

Magnetic stirrer and stir bar(s)

Naphthol Blue Black (dye content $\geq 85\%$)

Glacial Acetic Acid

Methanol

Fume hood

3 Standards and Controls

Not applicable.

4 Sampling or Sample Selection

Not applicable.

5 Procedures

5.1 Solution Preparation

a) Developer solution

Combine:

- Naphthol Blue Black - 2 g
- Glacial Acetic Acid - 100 ml
- Methanol - 900 ml

Stir until Naphthol Blue Black dissolves (approximately 30 minutes).

b) Rinse solution

Combine:

- Glacial Acetic Acid - 100 ml
- Methanol - 900 ml

5.2 Application

Note: All blood must be dried prior to application.

Note: Process may damage painted surfaces.

- a) Apply developer solution to specimen by spraying, dipping, painting, or squirting.
- b) Leave developer solution on specimen for 30 to 60 seconds.
- c) Apply rinse solution.
- d) Rinse with water.
- e) Allow specimen to dry.
- f) For digital capture and photography, see FBI Latent Print Units Processing Manual Preamble .

5.3 Storage

Developer and rinse solutions must be stored in glass bottles.

5.4 Shelf Life

Developer and rinse solutions have indefinite shelf lives provided the reagent checks are satisfactory.

5.5 Reagent Checks

See FBI Latent Print Units Processing Manual, Preamble

6 Calculations

Not applicable.

7 Measurement Uncertainty

Not applicable.

8 Limitations

Not applicable.

9 Safety

See FBI Laboratory Safety Manual for appropriate information.

10 References

FBI Laboratory Safety Manual, Federal Bureau of Investigation, Laboratory Division. Latest Revision.

FBI Latent Print Units Processing Manual, Preamble, Federal Bureau of Investigation, Laboratory Division. Latest Revision.

Sears, V. G. and Prizeman, T. M. "Enhancement of Fingerprints in Blood - Part 1: The Optimization of Amido Black." *JFI*. 50(5):470.

Trozzi, T. A., Schwartz, R. L., and Hollars, M. L. *Processing Guide for Developing Latent Prints*, FBI Laboratory, Washington DC, 2001.

| Rev. # | Issue Date | History |
|--------|------------|---|
| 0 | 01/13/14 | Original document issued. Derived from Discontinued Latent Print Operations Manual, Standard Operating Procedures for Processes Used to Develop Latent Prints. The original Latent Print Units Processing Manual consisted of a single document with a preamble and procedures for all processes. The current document separates each into its own separate document. |
| 1 | 10/02/17 | Specific section numbers referenced in Preamble removed throughout document. Section 1, latent print personnel added. Section 4 removed and remaining renumbered. Titles for new Section 4 and Section 7 modified. Section 9, generalized. Updated for Biometrics Analysis Unit. References updated. |

Approval

Redacted - Signatures on File

Standard Operating Procedures for Latent Print Processing with Amido Black (Water Base - Fischer 98)

1 Scope

Amido Black (Water base - Fischer 98) contains a blood fixer and is a process used by latent print personnel to develop latent prints and enhance visible prints that have been deposited in blood.

2 Equipment/Materials/Reagents

Beakers or graduated cylinders

Balance

Spatula

Distilled water

Tissue

Water (for rinse)

Squirt bottles, sprayers, brushes, or glass trays

Magnetic stirrer and stir bar(s)

Naphthol Blue Black (dye content $\geq 85\%$)

5-Sulfosalicylic Acid (purity $\geq 99\%$)

Formic Acid (concentrated)

Sodium Carbonate

Photo-Flo 600 Solution

Tween 20

N-dodecylamine Acetate

Glacial Acetic Acid

Fume hood

3 Standards and Controls

Not applicable.

4 Sampling or Sample Selection

Not applicable.

5 Procedures

5.1 Developer Solution Preparation

a) Combine:

- Naphthol Blue Black - 3 g
- Glacial Acetic Acid - 50 ml
- Distilled water - 500 ml
- 5-Sulfosalicylic Acid - 20 g
- Sodium Carbonate - 3 g
- Formic Acid - 50 ml
- Photo-Flo 600 Solution - 12.5 ml

Note: Can be used immediately with acceptable results but works best if mixed and stored in a bottle several days before use.

Photo-Flo 600 may be replaced with 125ml of Tween 20 detergent solution. Combine the following and stir until all chemicals dissolve:

- n-Dodecylamine Acetate - 3 g
- Tween 20 - 4 g
- Distilled water - 1000 ml

- a) Stir until Naphthol Blue Black dissolves (approximately 30 minutes).
- b) Raise final volume to approximately 1000 ml with distilled water.

5.2 Application

- a) Apply developer solution to specimen by spraying, dipping, painting, or squirting. The application of the solution can be isolated by using a tissue. The tissue(s) is placed on the specimen over the area to be processed. The solution is then applied to the tissue(s).

- b) Leave developer solution on specimen for 3 to 5 minutes.
- c) Rinse with water.
- d) Allow specimen to dry.
- e) For digital capture and photography, see FBI Latent Print Units Processing Manual, Preamble.

5.3 Storage

Developer solution may be stored in any type of laboratory accepted receptacle.

5.4 Shelf Life

Developer solution has an indefinite shelf life provided the reagent checks are satisfactory.

5.5 Reagent Checks

See FBI Latent Print Units Processing Manual, Preamble.

6 Calculations

Not applicable.

7 Measurement Uncertainty

Not applicable.

8 Limitations

Not applicable.

9 Safety

See FBI Laboratory Safety Manual for appropriate information.

10 References

FBI Laboratory Safety Manual, Federal Bureau of Investigation, Laboratory Division. Latest Revision.

FBI Latent Print Units Processing Manual, Preamble, Federal Bureau of Investigation, Laboratory Division. Latest Revision.

Sears, V. G. and Prizeman, T. M. "Enhancement of Fingerprints in Blood - Part 1: The Optimization of Amido Black". *JFI*.50(5):470.

Trozzi, T. A., Schwartz, R. L., and Hollars, M. L. *Processing Guide for Developing Latent Prints*, FBI Laboratory, Washington DC, 2001.

| Rev. # | Issue Date | History |
|--------|------------|--|
| 1 | 12/16/16 | Section 1, added personnel and removed “one-step”. Section 2, added two chemicals and tissue. Section 4 removed and remaining renumbered. Titles for Section 4 and Section 7 modified. Section 5.1, moved “Note” below first bulleted list; added information on Tween 20; moved stirring instructions to new numbered line. Section 5.2, added information on isolated processing. Section 5.5, removed specific section. Section 9, made general. Section 10, updated. |
| 2 | 10/02/17 | Updated to add Biometrics Analysis Unit. |

Approval

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Standard Operating Procedures for the Next Generation Identification System

1 Scope

These procedures apply to authorized personnel with password access to the Next Generation Identification System as a function of their current position. These Standard Operating Procedures are intended for employees who have successfully completed the Next Generation Identification System training.

2 Equipment/Materials/Reagents

The workstation consists of equipment and software provided and maintained by the Criminal Justice Information Services Division according to division specifications and requirements.

Scanner (FBI approved)

Appropriate operating system

Universal Latent Workstation software

3 Standards and Controls

Not applicable.

4 Sampling or Sample Selection

Not applicable.

5 Procedure

5.1 Friction Ridge Prints for a Next Generation Identification System Search

The examiner is responsible for determining if a friction ridge print(s) will be searched in the Next Generation Identification System. The examiner will consider several factors when determining which prints are appropriate for searching, such as type of evidence, quality and quantity of features, the Next Generation Identification System limitations, and case restrictions. It is a Next Generation Identification System requirement to plot a minimum of three dividing ridges and/or ending ridges in a friction ridge print in order to conduct a search.

5.1.1 All friction ridge prints appropriate for searching in the Next Generation Identification System must:

- Meet the requirements set forth in the FBI Latent Print Quality Assurance Manual, Procedures for Case Acceptance.
- Be suitable for comparison.
- Be actual size (1:1).
 - If not 1:1, personnel will use the scale for calibration. If no legible/reliable scale is present, or additional calibration is desired, the MorphoBis ridge tool may be used.

NOTE: The term “calibrate” refers to a Next Generation Identification System function used to determine the actual size of a digital image and the term will be used as such throughout this document.

5.1.2 All case-related work must be retained in the case record. In regards to the Next Generation Identification System, only information retained in the MorphoBis server of the Next Generation Identification System and the biographic search transaction history are considered part of the case record.

5.1.3 Automated searches may be conducted prior to manual comparisons and personnel will ensure that all requested examinations, to include manual comparisons, are conducted. An automated search is not a substitute for a manual comparison with a requested individual.

5.1.4 For unknown deceased searches, the examiner will refer to the FBI Laboratory, Latent Print Units Operations Manual, Standard Operating Procedures for Processing Unknown Deceased Cases.

5.2 Create a Case

Each case is uniquely identified by using a combination of a Latent Case Number and Latent Case Extension.

- The Latent Case Number must be 11 characters long. If the Case ID number is not the correct length, the number following the field office designation must be preceded by zeros - e.g., HQ-00012345. No sub files will be used in the Latent Case Number.
- The Latent Case Extension is five digits - e.g., 00001.

The Laboratory Number must be entered into the Case Edit Descriptors tab.

If personnel use a Latent Case Number that is different from the case’s Case ID number or HQ-A1546171, the Latent Case Number will be recorded in the case notes.

The Next Generation Identification System is an UNCLASSIFIED system. If personnel must use the Next Generation Identification System for a case that contains a classification of SECRET or above, they are responsible for understanding what information in the case is

classified and ensuring the information entered into the Next Generation Identification System is not classified. Where classification is a concern, consultation with the Next Generation Identification System Program Manager or designee is recommended prior to entering information and/or an image(s) into the Next Generation Identification System. Any information that was not entered to ensure that the classification was not compromised must be recorded in the case notes or *Activity and Communication Log (7-245)*. In the event that a classification spill is identified, personnel will cease work in the Next Generation Identification System for that case and contact the Next Generation Identification System Program Manager or designee immediately.

5.3 Conducting a Search of a Single Friction Ridge Print

5.3.1 Acquiring Images

An image(s) is scanned or imported and will appear in the Case Tree as an unprocessed Evidence Image. Latent prints and non-standard intentionally recorded prints must be scanned at a minimum of 1000 pixels per inch and standard intentionally recorded prints must be scanned at a minimum of 500 pixels per inch.

Images may be upscaled to meet the 500 pixels per inch or 1000 pixels per inch requirement for automated searches. However, if an identification is effected, all verifications will be conducted using the submitted image and not the image(s) in the system.

5.3.2 Quick Launch

Personnel may use the Quick Launch function, which works best for high-quality, clear prints. If an identification is not made as a result of a Quick Launch, an examiner will launch additional searches, utilizing manual encode or a combination of auto-encode and manual encode, unless such encoding and searching has already been done. Depending on case circumstances, launching additional searches may not be recommended. Supervisor approval, recorded in the case record, is required for not launching additional searches. The auto-encoding generated by Quick Launch is not considered appropriate markings for analysis.

5.3.3 Initiating Searches of a Single Friction Ridge Print

5.3.3.1 The examiner is responsible for searching all appropriate galleries (Criminal, Civil, Special Population Cognizant File, and/or the Unsolved Latent File). For each finger search, all ten fingers will be chosen.

5.3.3.2 For those prints where the analysis is conducted within the Next Generation Identification System and not printed (for example, when multiple examiners are launching the Next Generation Identification System searches in a large case), the examiner's encoding within the Next Generation Identification System may be considered analysis markings. The examiner will record in the case notes when analysis markings are only captured in the Next Generation Identification System.

5.3.3.3 Latent prints being submitted for a search of the Criminal File may be added to the Unsolved Latent File. Subsequent searches of the same encoding of a latent print should not be added to the Unsolved Latent File. For launches whose sole purpose is to add a print to the Unsolved Latent File, the examiner should choose to return at least one candidate.

5.3.4 Comparing Searches of a Single Friction Ridge Print

5.3.4.1 The examiner will compare candidate image(s) to the searched image(s) per the FBI Latent Print Units Operations Manual, Standard Operating Procedures for Examining Friction Ridge Prints. Any conclusions resulting from on-screen examinations must be recorded in the Next Generation Identification System.

5.3.4.1.1 Recording the conclusion in the Next Generation Identification System may not be appropriate due to case and/or operational need. The search will be administratively closed in the system using “No Decision” and marking the last candidate or the twentieth candidate as “Not Identified”. Examiners will retain any marked screenshots and record the conclusion in the case record.

5.3.4.2 Mated minutia are system generated and can be used to assist with comparison. An examiner is responsible for reaching his/her own conclusion based on the information in the region of interest returned.

5.3.4.3 The examiner is responsible for comparing candidates as described below:

For searches of the ten print database:

- Rolled prints - the returned fingerprint image
- Plain impressions - the returned image associated with the finger number listed in Database Maintenance

The examiner will compare the returned image contained within the matching minutia for palm print database searches. The palm print database contains both upper and lower palm print records, as well as major case prints.

Any manual comparisons done as a result of a returned search (for example, additional certification records are retrieved to address an inconclusive decision) will only focus on the finger returned (both rolled and plain) and/or the area of the palm as listed above.

5.3.4.4 At a minimum, the top three unique candidates for any single friction ridge print versus known database search will be compared unless the searched print is identified.

5.3.5 Conclusions for Searches of a Single Friction Ridge Print

5.3.5.1 If an identification decision is reached as a result of an on-screen comparison, the examiner must retain the image of the comparison screen with the marked matching minutia as an examination record. When an identification has been made, a legible reproduction of the known exemplar must be retained in the case record.

5.3.5.2 An exclusion evaluation decision in the Next Generation Identification System is defined as an exclusion with the region of interest returned by the system.

5.3.5.3 When searching in the Next Generation Identification System, the “Inconclusive” decision will refer to a known inconclusive evaluation decision as described in the FBI Latent Print Units Operations Manual, Standard Operating Procedures for Examining Friction Ridge Prints. If a latent inconclusive evaluation decision as described in the FBI Latent Print Units Operations Manual, Standard Operating Procedures for Examining Friction Ridge Prints, is reached, the “Inconclusive” decision will be used in the Next Generation Identification System; however, the case record must clearly note the basis for the inconclusive and the specific search(es) must be designated.

5.3.5.3.1 Any time a known inconclusive evaluation decision is rendered (manually or through an automated search), the examiner will compare (manually or on-screen) all records on the Biometric Information Retrieval screen for that identity that contain the corresponding area until a conclusive decision is rendered or no additional useful records exist. Prints will be reviewed on screen and only those containing useful information will be requested or printed, as needed. If no additional records have higher quality corresponding areas for comparison, the evaluation result remains inconclusive and the examiner must record the search results in the case notes. The examiner may also review the Certification File and/or the Latent Print Units Secondary Biometrics Library (see Section 5.7.2) for comparable areas.

5.3.5.4 When the region of interest in the Next Generation Identification System is unusable or lacks distinct ridge detail, this will be treated as a known inconclusive decision and the examiner will need to review any available impressions of the finger returned. When the region of interest is an encoding only or tracing, the examiner will select “No Decision” and continue the comparison process until the appropriate number of candidates is compared.

5.3.6 Unsolved Latent File Searches

Unsolved Latent File comparisons occur when a search of a single friction ridge print with the Unsolved Latent File returns candidates.

When a search of a single friction ridge print with the Unsolved Latent File returns a duplicate image of itself, the “No Decision” button will be selected. In addition, if a candidate is noted through an Unknown Biometric Identity Tracker review, the “No Decision” button will be selected. The association will not be verified or reported out.

In situations where an Unsolved Latent File search identification entry in the system will complicate work between agencies, the examiner will enter “No Decision” in the system instead of “Identification” as long as at least one other candidate has a decision. Also, in searches where all the returned candidates are a match or only a single candidate is returned, the examiner will mark the last candidate or the twentieth candidate as “Not Identified” to administratively close the case. The marked minutia screen is still printed and retained, the conclusion recorded outside the system, and the information retained in the case records.

The examiner must reach two distinct and consecutive non-identification decisions in order to stop comparing the remaining candidates in the candidate list. If unable to make two consecutive non-identification decisions in order to cease comparisons, it is at the discretion of the examiner to request additional candidates.

For identification and exclusion evaluation decisions, the examiner will follow Sections 5.3.5.1 and 5.3.5.2. Contributors will be notified of latent to latent identifications as necessary. For returned candidates that are not available, encoding only, or tracings, the examiner will choose “No Decision” as long as at least one other candidate has a decision. For an inconclusive decision, no further examinations are possible or necessary. Analysis of the returned candidates will be conducted by the examiner prior to comparison but retention of analysis in the case record is not required.

5.3.7 Records for Searches of a Single Friction Ridge Print

5.3.7.1 A result must be recorded for each search within the Next Generation Identification System. If a search was not compared, the reason must be clear in the case record. All searches should be closed out in the Next Generation Identification System. In order to close searches that are not compared, the examiner will enter a “non-id” decision for the last candidate or the twentieth candidate in the search list and save the result. It is not necessary for the examiner to compare the candidate with the submitted print.

5.3.7.2 A notation must be made in the case notes to indicate the Next Generation Identification System searches were conducted. All remaining search information is retained in the Next Generation Identification System.

5.3.7.2.1 Latent Print Operations Unit examiners must note in the case record if prints are retained in the Unsolved Latent File.

5.3.7.3 If a print was added to the Unsolved Latent File and an identification is effected, the print should be deleted from the Unsolved Latent File. If a print is unable to be removed from the Unsolved Latent File, the individual will contact the Next Generation Identification System Program Manager or designee. The removal attempt will be recorded in the case notes or Communication Log. All information related to the search, not otherwise defined in this document, will be maintained in the Next Generation Identification System.

5.3.7.4 Verifications may be conducted on-screen and an image of the markings retained in the case record. The individual conducting the verification must have a separate analysis record of a latent print(s) retained in the case record.

5.3.7.5 The Next Generation Identification System is a tool for latent print personnel to assist contributors in providing investigative leads. The value of the system is to provide potential persons of interest through identifications. Other evaluation decisions are of no significance. In results provided to contributors, exclusion and both inconclusive decisions in the Next Generation Identification System will be reported as no identifications were effected. The issuance of no identification conclusions may be under the primary examiner’s name only, as long as the case record reflects the identity of the personnel who conducted the search(es).

5.3.7.6 If the contributor has specifically requested a Next Generation Identification System search and none of the prints meet the criteria for an automated search, an indication to this effect will be included in the case notes as well as the results provided to contributors.

5.3.7.7 Another examiner will conduct a Next Generation Identification System Quality Assurance review when:

- The submission was received in the Latent Print Units on or after October 2, 2017.
- No identifications (manual or automated) were effected in the case AND
- Either Next Generation Identification System searches were requested OR prints were assessed for Next Generation Identification System searching AND,
- One of the following situations occurs:
 - Prints were claimed but no Next Generation Identification System searches were conducted.
 - Prints were assessed for Next Generation Identification System only, but no Next Generation Identification System searches were conducted.
 - A single print was searched in the Next Generation Identification System.

A second examiner will review all prints in the case for Next Generation Identification System quality and search or re-search any prints they deem appropriate for searching. Prints previously indicated as not suitable for comparison do not need to be reviewed. The results will be recorded in the case record.

5.3.7.8 If the manual comparison function is used within a case to conduct a single print comparison in the Next Generation Identification System, the conclusion will be retained in the Next Generation Identification System and associated with the case. Any Analysis and Comparison markings will be retained in the case record. If manual comparisons are conducted outside a case in the Next Generation Identification System, the examiner will follow the requirements as set forth in the FBI Latent Print Units Operations Manual, Standard Operating Procedures for Examining Friction Ridge Prints.

5.3.7.9 It is possible for a single individual to have multiple records. Consolidation will occur as set forth below:

- If one individual has multiple associated Universal Control Numbers in the Criminal or Civil galleries, personnel will notify the Next Generation Identification System Program Manager or designee. The Next Generation Identification System Program Manager or designee will inform personnel of the outcome of the Universal Control Number consolidation. An examiner will either wait until consolidation is complete, or must compare and verify all records and quote all known Universal Control Numbers so that the contributor can access the complete record.
- If one individual has multiple associated Universal Control Numbers in the Special Population Cognizant gallery, personnel must receive approval from

the Next Generation Identification System Program Manager or designee before reporting a Universal Control Number.

5.4 Ten Print Image Searches

5.4.1 Acquiring Images

Known images are scanned or imported at 500 pixels per inch or 1000 pixels per inch.

Unless forwarded by the Evidence Management Unit, if a known record is being forwarded to Criminal Justice Information Services Division for retention, permission must be obtained from the contributor and recorded in the Communication Log prior to forwarding the record. The contributor will be notified of the assigned Universal Control Number.

5.4.2 Initiating a Ten Print Image Search

The examiner must determine which galleries to search (Criminal, Civil, Special Population Cognizant, and/or Unsolved Latent File).

The examiner must confirm that the fingerprint images are displayed in the correct sequence. If not, the examiner must correct the sequence prior to searching.

5.4.3 Comparing Ten Print Image Searches

5.4.3.1 Compare candidate image(s) to the searched image(s) following the steps from the FBI Latent Print Units Operations Manual, Standard Operating Procedures for Examining Friction Ridge Prints. Any conclusions resulting from on-screen examinations must be recorded in the Next Generation Identification System.

5.4.4 Ten Print Image Search Conclusions and Records

5.4.4.1 When a ten print image search is conducted, the number in the Incident ID field (the number assigned to the capture by the system) will be recorded in the case record.

5.4.4.2 If a ten print image search results in an exclusion, the result will be recorded in the case record.

5.4.4.3 If a ten print image search results in an identification, the result will be recorded in the case record. A legible reproduction of the file print(s) and the submitted known record(s) will be retained in the case record.

5.4.4.4 Whenever a search of a known record in only the Criminal and/or Civil galleries results in multiple candidates, all candidates must be compared. Ten print image searches of the Special Population Cognizant file function differently than those of the other galleries. For Special Population Cognizant file searches, only the candidates with returned images will be compared.

5.4.4.5 When a ten print image search returns to the No Candidates Returned Queue, seen as the NOCANQ in the system, the examiner will clear the search from the queue and enter the result into the case record.

5.5 Subject and Ten Print Searches

Known records that are submitted and used for examinations must be searched against the Next Generation Identification System to attempt to find an antemortem record, unless restricted due to classification or circumstances of the case (e.g., juvenile prints, quality of the submitted known records). Any identification of a submitted record to non-duplicate records in the Next Generation Identification System must be verified. Also, biographical information of an individual may be searched in the Next Generation Identification System to locate a known exemplar from the FBI files, which is referred to as a Subject Search.

The location of an antemortem record will be achieved as follows:

- 1) If a ten print image search is conducted first and a record is not located, then the biographical information may still be searched, but it is not required.
- 2) If a Subject Search is conducted and no antemortem record is located, a ten print image search must be conducted if a known record is available.
- 3) For Subject Searches, the biographical information searched will be recorded in the Next Generation Identification System. A search(es) will be conducted using all biographical information for an individual available from a(n): 1) incoming communication (if present), 2) Communication Log (if available), 3) search of the Case ID in Sentinel (as applicable), and/or 4) contained on submitted known records. The location for information originating from any other source must be recorded in the case record.
 - a. All searches will be conducted in a case within MorphoBis.
 - b. The available name(s) of the individual, date(s) of birth, and Social Security Number(s), located from those places listed above, will be searched until a record is found or all efforts are exhausted.
 - c. Race will be searched as "U" only and Sex will be searched as "X" only. Any variations will be recorded in the case notes.
- 4) The case notes will document if a record for an individual was not located.
- 5) Both galleries (criminal and civil) will be searched, unless otherwise indicated in the case notes.

Any search utilizing only the Universal Control Number does not need to be recorded in the case notes nor must it be conducted within MorphoBis. If the Universal Control Number is from a location not listed in #3 above, the source of the information must be recorded in the case notes.

If available, the subject's Identity History Record may be viewed and printed from the Subject Search candidate window. An Identity History Record retrieved through a Subject Search must not be released to an outside contributor nor saved to Sentinel.

5.5.1 Ad Hoc Search

Ad Hoc searches are not as functional or reliable as the Subject Searches referenced in Section 5.5 and will have limited usage in casework or other examinations. An Ad Hoc search will only be used if the information required for a Subject Search is absent and attempts to obtain the proper information are unsuccessful.

Positive search results may or may not be relevant to the submitted information. Any positive search results that personnel consider probable will be vetted by the examiner to ensure a proper candidate was located. If an Ad Hoc search result is negative, personnel may report that a search of the system was unsuccessful. However, due to search limitations, personnel may not report definitively that the individual does not have a record in NGI.

5.6 Extended Subject Search

When biographical information is provided by the contributor for an individual of interest, but no prints can be located in the Next Generation Identification System for the subject, personnel may conduct an extended subject search, provided the submission is still open. Consultation with the Next Generation Identification System Program Manager or designee is recommended to determine current agency policies and relevant information needed from the contributors. Personnel will obtain approval from the contributor prior to conducting an extended subject search. The approval from the contributor for the extended subject search must be recorded in the Communication Log. The Next Generation Identification System Program Manager or designee will contact one or more outside agencies to request a search of the agency's database(s) using the biographical information available. The result of the search(es) must be retained in the case record. Any known prints received from the outside agency(ies) will be retained in the case record as examination records and will not be treated as evidence.

If prints are obtained through this extended subject search, the written notification will state that the known records were obtained through information sharing efforts with another agency.

If no known prints are obtained through this extended subject search, the written notification will indicate that known records were requested but could not be obtained from another agency.

5.7 Retrieving Secondary Biometrics

5.7.1 The Identity History Record will indicate the availability and type of secondary biometrics for an individual. If the record states that secondary biometrics are available, the images may be viewed in the Biometric Information Retrieval Screen, viewed in the Certification File Screen, retrieved into a submission, or printed from the Next Generation Identification System.

5.7.2 The Latent Print Units Secondary Biometrics Library consists of fingerprints and palm prints submitted to the Federal Bureau of Investigation. The physical records are maintained by Criminal Justice Information Services Division and may be utilized by personnel to assist with comparisons in cases until such time that all records are confirmed in the Next Generation Identification System.

5.7.3 Any time a known inconclusive evaluation decision is rendered (manually or through an automated search), the examiner will compare (manually or on-screen) all records on the Biometric Information Retrieval screen for that identity that contain the corresponding area until a conclusive decision is rendered or no additional useful records exist. Prints will be reviewed on screen and only those containing useful information will be requested or printed, as needed. If no additional records have higher quality corresponding areas for comparison, the evaluation result remains inconclusive and the examiner must record the search results in the case notes. The examiner may also review the Certification File and/or the Latent Print Units Secondary Biometrics Library for comparable areas.

5.7.4 Secondary biometrics retrieved from outside the Next Generation Identification System or those from a Certification File search in the Next Generation Identification System will be compared to known prints on file for that individual, if possible. If there is not enough information available to determine if the received secondary biometrics match the individual on file (e.g., fingers are not captured or clear), the secondary biometrics obtained will be reported as the purported prints of the individual. The Next Generation Identification System Program Manager or designee will be notified of any associated prints from the Certification File or secondary biometrics retrieved from outside the Next Generation Identification System. Otherwise, those prints retrieved directly from the Next Generation Identification System or the Latent Print Units Secondary Biometrics Library do not require comparison to file prints.

5.8 Unsolved Latent Match Notifications

An Unsolved Latent Match notification occurs when a submitted known or latent print is searched against the Unsolved Latent File and a possible match is found.

Assignment and reassignment of Unsolved Latent Matches will be coordinated by the Next Generation Identification System Program Manager or designee.

5.8.1 System Generated Unsolved Latent Matches

5.8.1.1 The examiner will review the Reverse Verification Queue and address current Unsolved Latent Matches or manually conduct comparisons provided by the Next Generation Identification System Program Manager or designee.

5.8.1.1.1 Analysis of the returned candidates will be conducted by the examiner prior to comparison but retention of analysis in the case record is not required unless an identification is effected.

5.8.1.2 The examiner must reach a conclusion in accordance with the FBI Latent Print Units Operations Manual, Standard Operating Procedures for Examining Friction Ridge Prints.

5.8.1.2.1 If an identification decision is reached, the examiner must retain the image of the comparison screen with the marked matching minutia as an examination record. When an identification has been made, a legible reproduction of the known exemplar must be retained in the case record.

5.8.1.3 All Unsolved Latent Matches should be closed out in the Next Generation Identification System. In order to close searches that are not compared (e.g., print was previously identified), the examiner will enter a “non-id” decision for the search and save the result. It is not necessary for the examiner to compare the candidate with the submitted print. The case record will reflect that no comparisons were conducted and the decision was recorded only to close the search in the Next Generation Identification System.

5.8.1.4 After all appropriate quality control measures are completed, personnel will determine if the identification is considered a “new identification” in regards to the case or if the identification is not new to the case or event. For example, whether the same person has been previously reported as identified on the same item or in the same incident.

For each new identification, an attempt must be made to contact the contributor to report an identification and for guidance regarding the necessity of further comparisons. Additional examinations in the case will be conducted as requested or, if contact is unsuccessful, at the discretion of the examiner conducting the examinations.

For all new identifications, the examiner must determine if the record is non-retrievable. Retrievability determination must be recorded in the case record.

For any records with no biographical information, the examiner will perform a latent search of the known image. If no usable record is found, the examiner will contact the Next Generation Identification System Program Manager or designee for assistance with examinations and reporting.

5.8.1.5 The examiner must issue written notification to the contributor for all new identifications.

5.8.2 Unsolved Latent Matches by Other Agencies as Conducted by the Latent Print Operations Unit and the Latent Print Support Unit

5.8.2.1 For notifications of potential identifications generated through the sharing of prints in the Unsolved Latent File, the Next Generation Identification System Program Manager or designee will check all case related records to determine if the latent print was previously identified by the Latent Print Units and attempt to delete the print from the Unsolved Latent File, if appropriate.

5.8.2.2 If the latent print has not been previously identified and known exemplar images are provided by the outside agency, the known exemplar will be treated as evidence and assigned an item identifier, or will be maintained as part of the case record.

The examiner will conduct an Analysis, Comparison, and Evaluation examination of the latent print. All required verification(s) and blind verification(s) must occur before contacting the contributor of that submission regarding the conclusion. An attempt must be made to contact the contributor to report a new identification and for guidance regarding the necessity of further

comparisons. Additional examinations in the case will be conducted as requested or, if contact is unsuccessful, at the examiner's discretion.

The examiner must issue written notification to the contributor for all new identifications. If the known exemplar is treated as evidence, a new Laboratory Number will be generated using the FBI Criminal Justice Information Services Division *Unsolved Latent File Notification* form (Appendix A) and a *Laboratory Report* will be issued under the new Laboratory Number. If the known exemplar is maintained as part of the case record, written notification of the results will be issued to the contributor.

5.8.2.3 Prior approval is not required for re-examinations based on notifications generated due to searches conducted by an outside agency potentially matching a print entered into the Unsolved Latent File by Laboratory personnel. If a technical conflict occurs such that Latent Print Units comparison results do not agree with those of the external agency, the conflict will be addressed according to the FBI Laboratory Operations Manual, Practices for Resolution of Scientific or Technical Disagreement.

5.8.2.4 Any identification(s) made as a direct result of this sharing effort will be reported as a verification but are subject to the same quality assurance measures applicable to identifications as described in the FBI Latent Print Units Operations Manual, Standard Operating Procedures for Examining Friction Ridge Prints.

5.8.3 Unsolved Latent Matches by Other Agencies as Conducted by the Terrorist Explosive Device Analytical Center

5.8.3.1 When an Unsolved Latent Match is generated through the sharing of Terrorist Explosive Device Analytical Center prints in the Unsolved Latent File, the outside agency may submit a request for information regarding case details of the print. The response to the request for information will include the print disposition and case related information (e.g. Laboratory Number, incident number) and a notation will be added to the case record regarding the request for information. An attempt will be made to remove the print from the Unsolved Latent File and add a notation to the case record regarding the removal.

5.8.3.2 Upon request, an examiner will conduct an Analysis, Comparison and Evaluation examination of the latent print. If the known image is unable to be retrieved from the Next Generation Identification System, then the agency who conducted the Unsolved Latent Match should submit the corresponding known image. The known exemplar will be treated as evidence and assigned an item identifier, or will be maintained as an examination record. If a technical conflict occurs such that Biometrics Analysis Unit comparison results do not agree with those of the external agency, the conflict will be addressed according to the FBI Laboratory Operations Manual, Practices for Resolution of Scientific or Technical Disagreement.

5.8.3.2.1 The examiner must issue written notification regarding the results of examinations. All required verification(s), blind verification(s), technical and administrative reviews must occur before contact is made regarding all conclusions.

5.9 Sharing of Latent and Known Images

Latent print images added to the Unsolved Latent File are forwarded to other agencies to be searched against their databases as part of a sharing effort. When a request to share latent or known print images is received or the case is a priority and results of the sharing effort must be expedited, the examiner will notify the Next Generation Identification System Program Manager or designee in order to share the images.

5.10 Creation and Maintenance of Special Population Cognizant Files for Laboratory Personnel

The creation and maintenance of all latent and known Special Population Cognizant Files will be coordinated by the Next Generation Identification System Program Manager or designee.

6 Universal Latent Workstation

If there is a breakdown in communications between Criminal Justice Information Services Division and the Next Generation Identification Latent Workstation, or the Next Generation Identification System Program Manager or designee deems it necessary, the Universal Latent Workstation software can be used to conduct a search(es) of the Next Generation Identification System and request images. A request for an image(s) or a digital search(es) will be given to the Next Generation Identification System Program Manager or other authorized Latent Print Units personnel and will be completed utilizing the Universal Latent Workstation software. All appropriate information on the search(es) will be retained in the case record.

7 Calculations

Not applicable.

8 Measurement Uncertainty

Not applicable.

9 Limitations

Three dividing ridges and/or ending ridges from the palmar surface of the hand must be marked in order to conduct a search of a single friction ridge print.

For optimal searching, latent print images must be 1:1.

The Next Generation Identification System will only accept images at 500 pixels per inch or 1000 pixels per inch.

Discs and biometric thumb drives are the only forms of storage media that can be used to import digital images.

Fingerprint images that have been migrated from the Legacy Integrated Automated Fingerprint Identification System may be too large to be searched as a fingerprint. These images must be acquired into the case again prior to being searched in the Next Generation Identification System against the rolled ten print images.

10 Safety

Not applicable.

11 References

FBI Laboratory Operations Manual, Practices for Resolution of Scientific or Technical Disagreement, Federal Bureau of Investigation. Laboratory Division. Latest Revision.

FBI Latent Print Units Quality Assurance Manual, Procedures for Case Acceptance. Federal Bureau of Investigation, Laboratory Division. Latest Revision.

FBI Latent Print Units Operations Manual, Standard Operating Procedures for Examining Friction Ridge Prints. Federal Bureau of Investigation, Laboratory Division. Latest Revision.

FBI Latent Print Units Operations Manual, Standard Operating Procedures for Processing Unknown Deceased Cases. Federal Bureau of Investigation, Laboratory Division. Latest Revision.

| Rev. # | Date | History |
|--------|----------|---|
| 5 | 02/07/18 | All abbreviations addressed. Minor wording, grammar, and punctuation changes throughout the document. Section 5.1.4 moved from Section 5.5. Added Case ID to Section 5.2. Modified latent image search references to conducting searches of a single friction ridge print for clarification. Section 5.3.1, added intentionally recorded prints. Section 5.3.2, added exception for previously encoded and searched prints. Section 5.3.5.3.1, clarified and removed requirement to search Secondary Biometrics Library. Section 5.3.6, added review exception. Section 5.3.7.2, ULF removed and added to new Section 5.3.7.2.1. Section 5.3.7.7, clarification of start date and what prints to review. Section 5.3.7.8, markings requirement added. Modified known image searches to Ten Print Image for clarity. Section 5.4.2, removed recording requirement to Section 5.4.4.1. Section 5.5, added allowance to not search submitted known records, Ad Hoc removed overall, expanded allowance for information on submitted known records, removed direction requirement, and allowed for certain searches outside MorphoBis. Section 5.7.3, clarified and removed requirement to search Secondary Biometrics Library. Added Section 5.8.1.1.1 and Section 5.8.1.2.1. Section 5.8.1.3, added example. Section 5.8.1.4 and Section 5.8.1.5, clarified “new identification”. |
| 6 | 11/07/18 | Throughout document, term “suitable” replaced with similar wording to avoid confusion with analysis term, minor wording modifications to align with other discipline document terms, and some minor formatting and wording changes. Section 5.2, clarified type of communication log. Section 5.3.1, clarified between types of intentionally recorded prints and added minimum requirement. Added Section 5.3.4.1.1. Section 5.3.6, added third paragraph. Section 5.3.4.4, added “At a minimum,”. Section 5.3.7, added option for twentieth candidate. Section 5.3.7.6, “statement” changed to “indication”. Section 5.4.4.1, updated for new workflow. Section 5.5.1 added. Section 5.8.3.3 renumbered to Section 5.8.3.2.1. |

Redacted - Signatures on File

Approval

Latent Print
Technical Leader

Date: 11/07/2018

Latent Print Operations
Unit Chief

Date: 11/07/2018

Latent Print Support
Unit Chief

Date: 11/07/2018

Biometrics Analysis
Unit Chief

Date: 11/07/2018

QA Approval

Quality Manager

Date: 11/07/2018

Appendix A: *FBI Criminal Justice Information Services Division Unsolved Latent File (ULF) Notification*

Redacted - Form on File

Standard Operating Procedures for Latent Print Processing with Ash Gray Powder

1 Scope

Ash Gray Powder is used by latent print personnel to develop latent prints on adhesive surfaces. |

2 Equipment/Materials/Reagents

Beakers or graduated cylinders

Camel hair brush or other similar small brush

Petri dish or other container

Spatula

Ash Gray Powder

Liqui-Nox[®]

Water

Photo-Flo 200 Solution

Photo-Flo 600 Solution

3 Standards and Controls

Not applicable.

4 Sampling or Sample Selection

Not applicable.

5 Procedures

5.1 Solution Preparation (Photo-Flo)

- a) Ash Gray Powder working solution
 - Place Ash Gray Powder in petri dish or other suitable container.
 - Add Photo-Flo 200 Solution or Photo-Flo 600 Solution and stir using a brush until the consistency of thin paint is achieved.

5.2 Solution Preparation (Liqui-Nox[®])

- a) Liqui-Nox[®] stock solution
 - Combine Liqui-Nox[®] and water in equal amounts and mix.
- b) Ash Gray Powder working solution
 - Place Ash Gray Powder in petri dish or other suitable container.
 - Add Liqui-Nox[®] stock solution and stir using a brush until a consistency between paint and thin paint is achieved (Note: solution will be frothy).

5.3 Application

- a) Paint Ash Gray Powder working solution onto adhesive surface with a brush.
- b) Let sit for a minimum of 30 seconds.
- c) Rinse with a slow stream of water.
- d) Allow to dry.
- e) For digital capture and photography, see FBI Latent Print Units Processing Manual Preamble.

5.4 Storage

- a) Liqui-Nox[®] stock solution may be stored in any type of laboratory accepted receptacle.
- b) Ash Gray Powder working solution is not stored. It is prepared as needed.

5.5 Shelf Life

- a) Liqui-Nox[®] stock solution has an indefinite shelf life provided the reagent checks are satisfactory.
- b) Ash Gray Powder working solution does not have a shelf life. It is prepared as needed.

5.6 Reagent Checks

See FBI Latent Print Units Processing Manual, Preamble.

6 Calculations

Not applicable.

7 Measurement Uncertainty

Not applicable.

8 Limitations

Not applicable.

9 Safety

See FBI Laboratory Safety Manual for appropriate information.

10 References

Bratton, R. and Gregus, J. "Development of a Black Powder Method to Process Adhesive Tapes". *Fingerprint Whorld*. 23(87):21.

FBI Laboratory Safety Manual, Federal Bureau of Investigation, Laboratory Division. Latest Revision.

Lo, I. K. L. "A Review on Detection of Latent Prints on Self-Adhesive Tapes". *Fingerprint Whorld*. 19(74):89.

Trozzi, T. A., Schwartz, R. L., and Hollars, M. L. *Processing Guide for Developing Latent Prints*, FBI Laboratory, Washington DC, 2001.

FBI Latent Print Units Processing Manual, Preamble, Federal Bureau of Investigation, Laboratory Division. Latest Revision.

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| 0 | 01/13/14 | Original document issued. Derived from Discontinued Latent Print Operations Manual, Standard Operating Procedures for Processes Used to Develop Latent Prints. |
| 1 | 10/02/17 | Specific section numbers referenced in Preamble removed throughout document. Section 1, latent print personnel added. Section 4 removed and remaining renumbered. Titles for new Section 4 and Section 7 modified. Section 9, generalized. Updated for Biometrics Analysis Unit. References updated. |

Approval

Redacted - Signatures on File

Standard Operating Procedures for Non-Traditional Automated Searching

1 Scope

Prints may be searched outside of the traditional Next Generation Identification System. Due to the limitations of bulk searching of Next Generation Identification System records or searches against non- Next Generation Identification System databases, appropriate documentation as required by the Latent Print Units Operations Manual, Standard Operating Procedures for the Next Generation Identification System, cannot be maintained. Therefore, any actionable results from these types of searches will be considered potential matches only, and will not be disseminated outside of the FBI Laboratory until the required examination documentation can be generated within the appropriate investigative case file.

These procedures apply to authorized personnel who are qualified to perform latent print comparisons, and who will screen the results from bulk searches or automated systems other than the Next Generation Identification System. The policy does not apply to the routine sharing of friction ridge prints as noted in the Latent Print Units Operations Manual, Standard Operating Procedures for the Next Generation Identification System.

2 Equipment/Materials/Reagents

The workstation consists of equipment and software provided and maintained by the Criminal Justice Information Services Division or other agency according to division or agency specifications and requirements.

3 Standards and Controls

Not applicable.

4 Sampling

Not applicable.

5 Establishment of Search Requirements

Prior to conducting searches outside of the traditional Next Generation Identification System, details of the search will be recorded within the case file. When not practical, such as with bulk searches, they can alternately be documented in an Electronic Communication. Details will include the customer, population or repositories of prints to be searched, parameters of the search, format of search results, and conditions under which comparisons will stop, if applicable. The Electronic Communication will be approved by the Technical Leader, appropriate Unit Chief(s), and the Next Generation Identification System Program Manager. The remaining Latent Print Unit Chiefs will be included on the distribution list.

6 Comparison of Search Results

Conclusions will be rendered according to the Latent Print Units Operations Manual, Standard Operating Procedures for Examining Friction Ridge Prints and will be performed only as a screening step. Due to the limitation on retaining examination records, identifications will be considered potential matches only, and will not be reported outside of the FBI Laboratory without further exploitation.

7 Exploitation of Results

7.1 Potential matches will be vetted to determine the appropriate next course of action based on classification, previous reporting, or ownership. Prints determined to have ownership outside of the FBI may require coordination with the owner of the record before any dissemination of results occurs. In these instances, the comparison may be returned to the owner to take action.

7.2 All potential matches to be released via the appropriate reporting will be re-compared by examiners to reach a definitive conclusion and all appropriate quality steps will be completed. All applicable examination records will be created and retained, and any reporting of results will follow the Latent Print Units Quality Assurance Manual, Laboratory Reports, Reviews and Retained Records or the Latent Print Units, Quality Assurance Manual, Alternate Methods of Communicating Results.

8 Calculations

Not applicable.

9 Measurement Uncertainty

Not applicable.

10 Limitations

Not applicable

11 Safety

Not applicable.

12 References

FBI Latent Print Units Operations Manual, Standard Operating Procedures for Examining Friction Ridge Prints, Federal Bureau of Investigation, Laboratory Division. Latest Revision.

FBI Latent Print Units Operations Manual, Standard Operating Procedures for the Next Generation Identification System, Federal Bureau of Investigation, Laboratory Division. Latest Revision.

FBI Latent Print Units Quality Assurance Manual, Laboratory Reports, Reviews and Retained Records. Latest Revision.

FBI Latent Print Units Quality Assurance Manual, Alternate Methods of Communicating Results. Latest Revision.

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| 0 | 12/13/2018 | Original issuance of document |

Approval

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Latent Print Operations
Unit Chief

Date: 12/11/2018

Latent Print Support Unit
Chief

Date: 12/11/2018

Biometrics Analysis Unit
Chief (Acting)

Date: 12/11/2018

Technical Leader

Date: 12/11/2018

QA Approval

Quality Manager

Date: 12/11/2018

Standard Operating Procedures for Processing with Cyanoacrylate Fuming

1 Scope

Cyanoacrylate fuming is used by Friction Ridge Discipline personnel to develop latent prints on non-porous and semi-porous items.

2 Limitations

The cyanoacrylate and aluminum weighing dish used in a specific chamber must be compatible to the dimensions or settings of that chamber.

3 Equipment/Materials/Reagents

Cyanoacrylate

CYANO-SHOT™

Lumicyano™

Aluminum weighing dish or similar container

Automated Cyanoacrylate Fuming Chamber(s) (Misonix®/Mystaire® and CAPTURE™ BT)

Cyanoacrylate fuming wand, cartridge(s), and butane

Cyanoacrylate Blowing Chamber(s)

Improvised cyanoacrylate fuming chamber(s)

Foster + Freeman SUPERfume® system

4 Procedures

4.1 Misonix®/Mystaire® Cyanoacrylate Fuming Chambers

Personnel will complete the following steps in order:

1. Place item into chamber, ensuring adequate spacing surrounding item for exposure.

2. Prior to beginning the humidity cycle, ensure the humidifier water tank has sufficient water for the cycle.
3. Begin the humidity cycle, which transitions to the fuming cycle once the set humidity value is reached (optimal 70% relative humidity).
4. At the start of the fuming cycle, weigh an appropriate amount of cyanoacrylate into an aluminum dish or similar container.
 - a. The appropriate amount of cyanoacrylate is based on the size of the chamber and the nature of the evidence.
 - b. Only the cyanoacrylate designated for that chamber can be used (see limitations).
5. When the set temperature value for the hot plate is reached, place cyanoacrylate container on the hot plate and press enter to resume the fuming cycle.
6. Upon completion of the fuming cycle, the chamber will purge fumes for a preset time. When the purge cycle is complete, remove the item and check chamber to ensure no items have been left behind.
7. Examine the item visually and/or under a forensic light source for latent prints (Refer to FBI Friction Ridge Discipline Processing Manual, Standard Operating Procedures for Processing with Forensic Light Sources).

4.2 Labconco CAPture™ BT Fuming Chambers

Personnel will complete the following steps in order:

1. Place item into chamber, ensuring adequate spacing surrounding item for exposure.
2. Prior to beginning the cycle, ensure the appropriate program is selected and the humidifier contains a sufficient amount of water.
3. Weigh an appropriate amount of cyanoacrylate into an aluminum weighing dish, ensuring any tabs on the aluminum dish are not folded down.
 - a. Only the cyanoacrylate designated for that chamber may be used (see limitations).
4. Place the aluminum dish on the white circle behind the hot plate door and start the process.
5. Upon completion of the full process, remove the item and check chamber to ensure no items have been left behind.
6. Examine the item visually and/or under a forensic light source for latent prints (Refer to FBI Friction Ridge Discipline Processing Manual, Standard Operating Procedures for Processing with Forensic Light Sources).

4.3 Additional Cyanoacrylate Fuming Methods (Non-automated)

a) To include the use of, but not limited to:

- Cyanoacrylate fuming wand(s).
- Cyanoacrylate Blowing Chamber.
- CYANO-SHOT™ (with or without Lumicyano™).
- Foster + Freeman SUPERfume® system.
- Improvised cyanoacrylate fuming chamber(s) (such as tents, non-automated cyanoacrylate fuming cabinets, and other non-manufactured chambers).

b) Test strip

- For handheld devices, such as a cyanoacrylate fuming wand, the test strip will be fumed prior to the fuming of evidence.
- For improvised cyanoacrylate fuming chambers, the test strip will be included with the evidence.
- If the test strip is negative, the evidence will be processed again (see FBI Friction Ridge Discipline Processing Manual, Preamble).
- Results of the test strip must be recorded for each cycle in the case record.

c) Processing

- Personnel will process the evidence, following the manufacturer's recommendations, if applicable, until sufficient development occurs.
- The method of processing must be recorded in the case record if non-automated.
- For digital capture and photography, see FBI Friction Ridge Discipline Processing Manual Preamble.

4.4 Storage

Original cyanoacrylate containers.

4.5 Shelf Life

Cyanoacrylate has an indefinite shelf life provided the reagent checks are satisfactory.

5 Standards and Controls

See FBI Friction Ridge Discipline Processing Manual, Preamble.

6 Safety

See FBI Laboratory Safety Manual for appropriate information.

7 Calculations

Not applicable.

8 Measurement Uncertainty

Not applicable.

9 Sampling

Not applicable.

10 References

FBI Laboratory Safety Manual, Federal Bureau of Investigation, Laboratory Division. Latest Revision.

FBI Friction Ridge Discipline Processing Manual, Preamble, Federal Bureau of Investigation, Laboratory Division. Latest Revision.

Lewis, L. A., Smithwick, R. W., Devault, G. L., Bolinger, B., and Lewis, S. A. "Processes involved in the Development of Latent Fingerprints using the Cyanoacrylate Fuming Method". JFI. 46(2):241.

McLaren, C., Lennard, C., & Stoilovic, M. Methylamine pretreatment of dry latent fingerprints on polyethylene for enhanced detection by cyanoacrylate fuming. JFI.60(2):199-222.

Poudel, K. Testing the Effectiveness of Lumicyano with "Cyanoshot" Components when RAM Use is limited or restricted: A Novel HEAT Solution, PowerPoint. Quantico, VA: FBI (Publication Pending), 2019.

Trozzi, T. A., Schwartz, R. L., and Hollars, M. L. *Processing Guide for Developing Latent Prints*, FBI Laboratory, Washington DC, 2001.

| Rev. # | Issue Date | History |
|--------|------------|--|
| 1 | 10/02/17 | Specific section numbers referenced in Preamble removed throughout document. Section 1, latent print personnel added. Section 2 and Section 5.1, cabinet brand added. Section 4 removed and remaining renumbered. Titles for Section 4 and Section 7 modified. Section 5.1d, clarified. Section 5.2 added and remaining renumbered. Section 5.3b and Section 5.3c, location added. Section 8, glue and boats added. Section 9, generalized. Updated for Biometrics Analysis Unit. References updated. Abbreviations addressed. |
| 2 | 04/17/20 | Replace Latent Print Units with Friction Ridge Discipline. Minor spelling, grammar and wording updates. Used “item” in place of specimens and other terms in document. Remove latent print in title and modified Scope. Reorganized Sections in document for easier flow and renamed to match Laboratory requirements as needed. Section 2, clarified limitations. Section 3, limited list to primary chemicals and equipment, eliminated peripherals, and added CYANO-SHOT™ and Lumicyano. Section 4, streamlined instructions. Section 4.3, added third bullet. Section 10, updated. |

Approval

Redacted - Signatures on File

Friction Ridge Discipline
Technical Leader

—

Date: 04/16/2020

Latent Print Operations
Unit Chief

—

Date: 04/16/2020

Acting Latent Print Support
Unit Chief

—

Date: 04/16/2020

Acting Scientific and
Biometrics Analysis Unit Chief

—

Date: 04/16/2020

Standard Operating Procedures for Latent Print Processing with Diaminobenzidine

1 Scope

Diaminobenzidine is used by latent print personnel to develop latent prints and enhance visible prints deposited in blood.

2 Equipment/Materials/Reagents

Beakers or graduated cylinders

Balance

Spatula

Distilled water

Squirt bottles, sprayers, tissues, brushes, or glass trays

Magnetic stirrer and stir bar(s)

Freezer

3,3'-Diaminobenzidine Tetrahydrochloride (purity $\geq 97\%$)

Hydrogen Peroxide (30% Solution)

1M Phosphate Buffer Solution (pH 7.4)

5-Sulfosalicylic Acid (purity $\geq 99\%$)

3 Standards and Controls

Not applicable.

4 Sampling or Sample Selection

Not applicable.

5 Procedures

5.1 Solution Preparation

a) Solution A (Fixer solution)

Combine:

- 5-Sulfosalicylic Acid - 20 g
- Distilled water - 1000 ml

Stir until 5-Sulfosalicylic Acid dissolves.

b) Solution B (Buffer solution)

Combine:

- 1 M Phosphate Buffer Solution - 100 ml
- Distilled water - 800 ml

c) Solution C (Diaminobenzidine solution)

Combine:

- 3,3'-Diaminobenzidine Tetrahydrochloride - 1 g
- Distilled water - 100 ml

Stir until 3,3'-Diaminobenzidine Tetrahydrochloride dissolves.

d) Developer solution

Combine:

- Solution B (Buffer solution) - 180 ml
- Solution C (Diaminobenzidine solution) - 20 ml
- Hydrogen Peroxide (30% solution) - 1 ml

Mix thoroughly.

5.2 Application

- a) Apply Solution A (Fixer solution) to specimen by spraying, dipping, squirting, painting, or tissue method.
- b) Leave Solution A (Fixer solution) on specimen for 3 to 5 minutes.
- c) Apply distilled water to specimen by spraying, dipping, squirting, painting, or tissue method.
- d) Leave distilled water on specimen for 30 to 60 seconds.
- e) Apply Developer solution to specimen by spraying, dipping, squirting, painting, or tissue method.
- f) Leave Developer solution on specimen to achieve maximum contrast and development – do not exceed 5 minutes.

- g) Apply distilled water to specimen by spraying, dipping, squirting, painting, or tissue method to stop development process.
- h) Allow specimen to dry.
- i) For digital capture and photography, see FBI Latent Print Units Processing Manual Preamble.

5.3 Storage

- a) Solution A (Fixer solution) and Solution B (Buffer solution) may be stored in any type of laboratory accepted receptacle.
- b) Solution C (Diaminobenzidine solution) must be stored frozen in a container that can withstand extreme cold.
- c)..Storage is not applicable to developer solution. It is prepared as needed.

5.4 Shelf Life

- a) Solution A (Fixer solution) and Solution B (Buffer solution) have indefinite shelf lives provided the reagent checks are satisfactory.
- b) Solution C (Diaminobenzidine solution) has a 6 month shelf life when frozen provided the reagent checks are satisfactory.
- c) Developer solution is not retained, prepare as needed.

5.5 Reagent Checks

See FBI Latent Print Units Processing Manual, Preamble.

6 Calculations

Not applicable.

7 Measurement Uncertainty

Not applicable.

8 Limitations

Not applicable.

9 Safety

See FBI Laboratory Safety Manual for appropriate information.

10 References

Allman, D. and Pounds, C. A. "Diaminobenzidine: A Simple, Safe, and Sensitive Method for the Enhancement of Blood Marks at a Scene of Crime and in the Laboratory". *CRSE Report*. No. 733.

FBI Laboratory Safety Manual, Federal Bureau of Investigation, Laboratory Division. Latest Revision.

FBI Latent Print Units Processing Manual, Preamble, Federal Bureau of Investigation, Laboratory Division. Latest Revision.

Trozzi, T. A., Schwartz, R. L., and Hollars, M. L. *Processing Guide for Developing Latent Prints*, FBI Laboratory, Washington DC, 2001.

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| 0 | 01/13/14 | Original document issued. Derived from Discontinued Latent Print Operations Manual, Standard Operating Procedures for Processes Used to Develop Latent Prints. The original LPU Processing Manual consisted of a single document with a preamble and procedures for all processes. The current document separates each into its own separate document. |
| 1 | 10/02/17 | Specific section numbers referenced in Preamble removed throughout document. Section 1, latent print personnel added. Section 4 removed and remaining renumbered. Titles for Section 4 and Section 7 modified. Section 9, generalized. Updated for Biometrics Analysis Unit. References updated. Abbreviations addressed. |

Approval

Redacted - Signatures on File

Standard Operating Procedures for Latent Print Processing with Forensic Light Sources

1 Scope

Forensic Light Sources are used by latent print personnel to examine any type of evidence for the presence of latent prints. Forensic Light Sources are used before any processing is conducted in order to visualize any inherent fluorescence and are also used in conjunction with certain processes that may result in fluorescence or improved contrast.

2 Equipment/Materials/Reagents

LASER (532nm)

Blue Forensic Light Source (450nm)

Long-wave ultraviolet (UV) Forensic Light Source (365nm)

Short-wave ultraviolet Forensic Light Source (254nm)

Reflective Ultraviolet Imaging System (RUVIS)

CrimeScope® (Ultraviolet 300-400nm, 415nm, 445nm, 455nm, 475nm, 495nm, CrimeSceneScope [Crime Scene Search short pass filter SP530nm], 515nm, 535nm, 555nm, SP575nm, 600nm, 630nm, 670nm, white light and infrared output)

Other Forensic Light Sources

Barrier filter or eye-wear with appropriate barrier filter

3 Standards and Controls

Not applicable.

4 Sampling or Sample Selection

Not applicable.

5 Procedures

a) Use appropriate barrier filter (e.g., protective eye wear) and ensure it matches or exceeds

Forensic Light Source's wavelength.

- b) Turn on the Forensic Light Source.
- c) Adjust or select the appropriate Forensic Light Source intensity and/or wavelength as necessary and available.
- d) View evidence using the Forensic Light Source.
- e) Turn off the Forensic Light Source.
- f) Remove protective barrier filter (e.g., protective eye wear).
- g) For digital capture and photography, see FBI Latent Print Units Processing Manual Preamble.

6 Calculations

Not applicable.

7 Measurement Uncertainty

Not applicable.

8 Limitations

Fluorescent compounds will suffer from loss of fluorescent intensity over time; as such, fluorescent prints will be captured as soon as is practicable.

Short-wave UV light (254nm) is detrimental to DNA examinations.

9 Safety

See FBI Laboratory Safety Manual for appropriate information.

10 References

FBI Laboratory Safety Manual, Federal Bureau of Investigation, Laboratory Division. Latest Revision.

FBI Latent Print Units Processing Manual, Preamble, Federal Bureau of Investigation, Laboratory Division. Latest Revision.

Lee, H.C. and Gaensslen, R. E. (1994). Advances in Fingerprint Technology. Boca Rotan:CRC Press.

LIA Laser Safety Committee, Edited by David H. Sliney. (1993). Laser Safety Guide, 9th ed. Orlando:Laser Institute of America.

Margot, P. and Lennard, C. (1994). Fingerprint Detection Techniques, 6th ed., Switzerland, Institut de Police Scientifique et de Criminologie.

Menzel, E. (1999). Fingerprint Detection with Lasers, 2nd ed. New York:Marcel Dekker, Inc.

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| 0 | 01/13/14 | Original document issued. Derived from Discontinued Latent Print Operations Manual, Standard Operating Procedures for Processes Used to Develop Latent Prints. The original LPU Processing Manual consisted of a single document with a preamble and procedures for all processes. The current document separates each into its own separate document. This document combines Procedures for Crimescope™, Coherent Verdi V-10 Laser, Polilight™ CSD-PL6, Scenescope™, and Ultraviolet Light. |
| 1 | 10/02/17 | Specific section numbers referenced in Preamble removed throughout document. Section 1, latent print personnel added. Section 4 removed and remaining renumbered. Titles for Section 4 and Section 7 modified. Section 9, generalized. Updated for Biometrics Analysis Unit. References updated. |

Approval

Redacted - Signatures on File

Standard Operating Procedures for Latent Print Processing with Leucocrystal Violet

1 Scope

Leucocrystal Violet is used by latent print personnel to enhance visual prints or develop latent prints deposited in blood.

2 Equipment/Materials/Reagents

Beakers or graduated cylinders

Balance

Spatula

Distilled water

Squirt bottles, sprayers, and tissues or paper towels

Dark bottles

Magnetic stirrer and stir bar(s)

Leucocrystal Violet (dye content $\geq 90\%$)

Sodium Acetate

Hydrogen Peroxide (3% solution)

5-Sulfosalicylic Acid (purity $\geq 99\%$)

3 Standards and Controls

Not applicable.

4 Sampling or Sample Selection

Not applicable.

5 Procedures

5.1 Leucocrystal Violet Working Solution Preparation

Combine:

- Hydrogen Peroxide (3% solution) - 1000 ml
- 5-Sulfosalicylic Acid - 20 g
- Sodium Acetate - 7.4 g
- Leucocrystal Violet - 2 g

Stir until Leucocrystal Violet dissolves (approximately 30 minutes).

5.2 Application

- a) Apply Leucocrystal Violet working solution to specimen.

Note: Leucocrystal Violet is prone to over-development. Use with finest mist possible to avoid over-development and running of bloody print.

- b) Blot area with a tissue or paper towel.

- c) For digital capture and photography, see FBI Latent Print Units Processing Manual Preamble.

5.3 Storage

Leucocrystal Violet working solution must be stored in a dark bottle.

5.4 Shelf Life

Leucocrystal Violet working solution has a 30-day shelf life provided the reagent checks are satisfactory.

5.5 Reagent Checks

See FBI Latent Print Units Processing Manual, Preamble.

6 Calculations

Not applicable.

7 Measurement Uncertainty

Not applicable.

8 Limitations

Not applicable.

9 Safety

See FBI Laboratory Safety Manual for appropriate information.

10 References

FBI Laboratory Safety Manual, Federal Bureau of Investigation, Laboratory Division. Latest Revision.

FBI Latent Print Units Processing Manual, Preamble, Federal Bureau of Investigation, Laboratory Division. Latest Revision.

Takayanagi, M., et al. "Colorimetry of Hydrogen Peroxide Using Leuco Crystal Violet (LCV)". *Japanese Journal of Clinical Chemistry*. 14:337.

Trozzi, T. A., Schwartz, R. L., and Hollars, M. L. *Processing Guide for Developing Latent Prints*, FBI Laboratory, Washington DC, 2001.

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| 0 | 01/13/14 | Original document issued. Derived from Discontinued Latent Print Operations Manual, Standard Operating Procedures for Processes Used to Develop Latent Prints. The original LPU Processing Manual consisted of a single document with a preamble and procedures for all processes. The current document separates each into its own separate document. |
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Approval

Redacted - Signatures on File

Standard Operating Procedures for Latent Print Processing with Ninhydrin

1 Scope

Ninhydrin is used by latent print personnel to develop prints on porous and semi-porous surfaces. It reacts with the amino acids that are present in perspiration.

2 Equipment/Materials/Reagents

Beakers or graduated cylinders

Balance

Spatula

Squirt bottles, sprayers, brushes, or glass trays

Dark bottles

Magnetic stirrer and stir bar(s)

Humidity chamber or steam iron

Ninhydrin

Acetone

Petroleum Ether

Isopropanol

Methanol

Fume hood

3 Standards and Controls

Not applicable.

4 Sampling or Sample Selection

Not applicable.

5 Procedures

5.1 Solution Preparation (Petroleum Ether)

5.1.1 Large Quantity Solution Preparation

a) Ninhydrin stock solution

Combine:

- Ninhydrin – 700 g
- Methanol – 3500 mL

Stir until Ninhydrin dissolves.

b) Ninhydrin working solution

Remove 1500 mL of Petroleum Ether from the approximately 20 L container.

Combine:

- Isopropyl Alcohol – 800 mL
- Ninhydrin stock solution – 700 mL

Add to the remaining Petroleum Ether in the approximately 20 L container.

Agitate container to mix solution.

5.2 Solution Preparation (Acetone)

Ninhydrin working solution

Combine:

- Ninhydrin - 6 g
- Acetone - 1000 ml

Stir until Ninhydrin dissolves.

5.3 Application

5.3.1 Standard Method

a) Apply solution to specimen.

b) Allow specimen to dry completely.

c) Place in humidity chamber at 70%-80% relative humidity and 70-80°C for approximately 5 minutes or until desired development occurs.

d) For digital capture and photography, see FBI Latent Print Units Processing Manual Preamble.

5.3.2 Alternate Methods

- a) Apply damp heat with steam iron for several minutes. If latent print development is insufficient, continue to apply damp heat for a few additional minutes.
- b) In some circumstances heat may be detrimental to the condition of the specimen(s). In these circumstances the specimens(s) may be left to dry and then placed in a sealed bag or container until development has occurred.

Note: The use of alternate methods must be recorded.

5.4 Storage

- a) Ninhydrin stock solution must be stored in a dark glass bottle.
- b) Ninhydrin working solution may be stored in any of the following receptacles:
 - Dark glass bottle
 - Metal can
 - Stainless steel container

5.5 Shelf Life

- a) Ninhydrin stock solution has an indefinite shelf life provided the reagent checks are satisfactory.
- b) Ninhydrin working solution has a shelf life of 1 year provided the reagent checks are satisfactory.

5.6 Reagent Checks

See FBI Latent Print Units Processing Manual, Preamble.

6 Calculations

Not applicable.

7 Measurement Uncertainty

Not applicable.

8 Limitations

Not applicable.

9 Safety

See FBI Laboratory Safety Manual for appropriate information.

10 References

FBI Laboratory Safety Manual, Federal Bureau of Investigation, Laboratory Division. Latest Revision.

FBI Latent Print Units Processing Manual, Preamble, Federal Bureau of Investigation, Laboratory Division. Latest Revision.

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| 0 | 01/13/14 | Original document issued. Derived from Discontinued Latent Print Operations Manual, Standard Operating Procedures for Processes Used to Develop Latent Prints. The original LPU Processing Manual consisted of a single document with a preamble and procedures for all processes. The current document separates each into its own separate document. This document combines Procedures for Ninhydrin (Acetone Base) and Ninhydrin (Petroleum Ether Base). |
| 1 | ??/??/?? | Specific section numbers referenced in Preamble removed throughout document. Section 1, latent print personnel added. Section 4 removed and remaining renumbered. Titles for Section 4 and Section 7 modified. Section 9, generalized. Updated for Biometrics Analysis Unit. References Updated. Abbreviations addressed. |

Approval

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Standard Operating Procedures for Latent Print Processing with Physical Developer

1 Scope

Physical Developer is used by latent print personnel to develop latent prints on porous, semi-porous, and certain non-porous surfaces.

2 Equipment/Materials/Reagents

Beakers or graduated cylinders

Glass or plastic trays

Dark bottles

Balance

Spatula

Magnetic stirrer and stir bar(s)

Orbital shaker

Iron, heater, or dryer

Distilled water

Water (for rinses)

Citric Acid

Maleic Acid

Silver Nitrate

Bleach

Synperonic-N or Tween 20

Ferrous Ammonium Sulfate

n-Dodecylamine Acetate

Ferric Nitrate

3 Standards and Controls

Not applicable.

4 Sampling or Sample Selection

Not applicable.

5 Procedures

5.1 Solution Preparation

a) Maleic Acid solution

Combine:

- Maleic Acid - 25 g
- Distilled water - 1000 ml

Stir until solid dissolves.

b) Redox solution

In the order listed below, stir until each solid is dissolved before adding the next solid:

- Distilled water - 1000 ml
- Citric Acid - 20 g
- Ferric Nitrate - 30 g
- Ferrous Ammonium Sulfate - 80 g

c) Detergent solution

Combine:

- n-Dodecylamine Acetate - 3 g
- Synperonic-N or Tween 20- 4 g
- Distilled water - 1000 ml

Stir until all chemicals dissolve.

d) Silver Nitrate solution

Combine:

- Silver Nitrate - 200 g
- Distilled water - 1000 ml

Stir until solid dissolves.

e) Physical Developer working solution

While stirring, combine in the order listed:

- Redox solution - 1000 ml
- Detergent solution - 40 ml

- Silver Nitrate solution - 50 ml
- Stir for at least three minutes.

f) Bleach solution (optional)

Combine:

- Bleach - 500 ml
- Distilled water - 500 ml

Note: The bleach solution may darken latent prints developed with Physical Developer, lighten the background, and remove any Ninhydrin stains that may still be present on the specimen. The bleach solution is especially effective on paper bags and paper currency.

5.2 Application

Note: Approximately 20 check-sized specimens or approximately 7 letter-size specimens can normally be processed with 1L of Physical Developer working solution and 1L of Maleic Acid solution.

- a) Immerse specimen(s) in Maleic Acid solution.
- b) Agitate solution, manually or with orbital shaker, for a minimum of 15 minutes.
- c) Immerse specimen(s) in Physical Developer working solution.
- d) Agitate solution, manually or with orbital shaker, for 10-15 minutes.
- e) Immerse specimen(s) in first water rinse for at least 1 minute.
- f) Rinse specimen(s) in second water rinse.
- g) Dry specimen(s) in air or by applying heat with an iron, heater, or dryer.
- h) Optional rinse with Bleach solution
 - Immerse specimen(s) in Bleach solution, 10-15 seconds or until desired contrast is achieved.
 - Rinse specimen(s) in water.
 - Dry specimen(s) as described in g above.
- i) For digital capture and photography, see FBI Latent Print Units Processing Manual Preamble.

5.3 Storage

- a) Maleic Acid, Redox, Detergent, and Bleach solutions may all be stored in any type of laboratory acceptable receptacle.
- b) Silver Nitrate solution must be stored in a dark bottle.
- c) Physical Developer working solution is not stored. It is prepared as needed.

5.4 Shelf Life

- a) Maleic Acid, Redox, and Bleach solution have indefinite shelf lives provided the reagent checks are satisfactory.
- b) Detergent and Silver Nitrate solution each have a shelf life of 1 year provided the reagent checks are satisfactory.
- c) Physical Developer working solution is not retained. It is prepared as needed.

5.5 Reagent Checks

See FBI Latent Print Units Processing Manual, Preamble.

6 Calculations

Not applicable.

7 Measurement Uncertainty

Not applicable.

8 Limitations

All metal items, such as staples and paper clips, must be removed from specimen(s) prior to Physical Developer processing. Metal tweezers cannot be used during processing.

9 Safety

See FBI Laboratory Safety Manual for appropriate information.

10 References

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| 2 | 10/02/17 | Updated for Biometrics Analysis Unit. Section 5.3, modified “accepted” to “acceptable”. Abbreviations addressed. |

Approval

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Standard Operating Procedures for Latent Print Processing with Powders

1 Scope

Powdering is the application of finely ground, colored powder, which adheres to moisture, oils, and other residues, used by latent print personnel to develop latent prints.

2 Equipment/Materials/Reagents

a) Nonmagnetic powders:

- Black powder
- Gray/silver powder
- White powder
- Other colors of powder may be available

b) Magnetic powders:

- Black magnetic powder
- Gray/silver magnetic powder
- Other colors of powder may be available

c) Applicators:

- Magnetic wand
- Camel-hair brush
- Fiberglass filament brush
- Other types of brushes may be available
- Cotton batting

d) Dish

3 Standards and Controls

Not applicable.

4 Sampling or Sample Selection

Not applicable.

5 Procedures

5.1 Application

5.1.1 Nonmagnetic Powders

- a) Pour needed amount of powder into a small pile or dish.
- b) Dip brush bristle tips into powder.
- c) Gently brush surface.
- d) Brush in direction of any ridges that begin to appear.
- e) Build powder onto ridges and stop when latent print reaches a point of sufficient development.
- f) For additional clarity, cotton may be swabbed across the specimen to increase contrast between the print(s) and the surface of the specimen.

5.1.2 Magnetic Powders

- a) Place magnetic wand with magnet engaged into a container of magnetic powder - this will produce a bristle-like effect at the end of the wand when withdrawn.
- b) Apply, ensuring that only the powder touches the surface.
- c) When finished, release excess powder into container by disengaging the magnet.
- d) For additional clarity, remove excess powder from the print(s) and surrounding area using an empty magnetic wand.

5.2 Storage

Powders may be stored in any approved laboratory containers.

5.3 Shelf Life

Powders have an indefinite shelf life (may require desiccating for longer term storage).

6 Calculations

Not applicable.

7 Measurement Uncertainty

Not applicable.

8 Limitations

Not applicable.

9 Safety

See FBI Laboratory Safety Manual for appropriate information.

10 References

FBI Laboratory Safety Manual, Federal Bureau of Investigation, Laboratory Division. Latest Revision.

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| 1 | 10/02/17 | Section 1, latent print personnel added. Section 4 removed and remaining renumbered. Titles for Section 4 and Section 7 modified. Section 9, generalized. Updated for Biometrics Analysis Unit. References updated. |

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Standard Operating Procedures for Latent Print Processing with RAM

1 Scope

RAM (combination of fluorescent dyes Rhodamine 6G, Ardrox P133D, and MBD) is a fluorescent dye used by latent print personnel to make cyanoacrylate-developed latent prints more visible on all colors of non-porous and semi-porous surfaces.

2 Equipment/Materials/Reagents

Beakers

Graduated cylinders

Balance

Spatula

Squirt bottles, sprayers, brushes, or glass trays

Dark glass bottles

Magnetic stirrer and stir bar(s)

4-(4-methoxybenzylamino)-7-nitrobenzofurazan (MBD)

Rhodamine 6G (dye content $\geq 99\%$)

Ardrox P133D

Acetone

Methanol

Isopropanol

Petroleum Ether

Acetonitrile

Forensic Light Source(s)

Fume hood

3 Standards and Controls

Not applicable.

4 Sampling or Sample Selection

Not applicable.

5 Procedures

5.1 Solution Preparation

a) Rhodamine 6G stock solution

Combine:

- Rhodamine 6G - 1 g
- Methanol - 1000 ml

Stir until Rhodamine 6G dissolves.

b) MBD stock solution

Combine:

- MBD - 1 g
- Acetone - 1000 ml

Stir until MBD dissolves.

c) RAM working solution

Combine in the order listed:

- Rhodamine 6G stock solution - 3 ml
- Ardrex P133D - 2 ml
- MBD stock solution - 7 ml
- Methanol - 20 ml
- Isopropanol - 10 ml
- Acetonitrile - 8 ml
- Petroleum Ether - 950 ml

Caution: DO NOT place on a magnetic stirrer.

5.2 Application

- a) Apply solution to specimen by spraying, dipping, squirting, or painting.
- b) Allow specimen to dry completely.
- c) View using forensic light source at wavelengths in the 365 nm to 540 nm range. (Refer to FBI Latent Print Units Processing Manual, Standard Operating Procedures for Latent Print Processing with Forensic Light Sources.)
- d) For digital capture and photography, see FBI Latent Print Units Processing Manual Preamble.

5.3 Storage

- a) Rhodamine 6G stock, MBD stock and RAM working solutions must be stored in dark glass bottles. RAM working solution can also be stored in a metal can.
- b) Ardrex P133D is stored in its original container or dark glass bottle.

5.4 Shelf Life

- a) Rhodamine 6G stock, MBD stock and Ardrex P133D stock solutions each have an indefinite shelf life.
- b) RAM working solution has an indefinite shelf life provided the reagent checks are satisfactory. If the working solution is separated, shake vigorously. If the solution does not return to suspension, discard the solution.

5.5 Reagent Checks

See FBI Latent Print Units Processing Manual, Preamble.

6 Calculations

Not applicable.

7 Measurement Uncertainty

Not applicable.

8 Limitations

Fluorescent compounds will suffer from loss of fluorescent intensity over time; as such,

fluorescent prints will be captured as soon as is practicable.

9 Safety

See FBI Laboratory Safety Manual for appropriate information.

10 References

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| 1 | 10/02/17 | Specific section numbers referenced in Preamble removed throughout document. Section 1, latent print personnel added. Section 4 removed and remaining renumbered. Titles for Section 4 and Section 7 modified. Section 5.4, Waste Stream removed. Section 9, generalized. Updated for Biometrics Analysis Unit. References Updated. |

Approval

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Standard Operating Procedures for Latent Print Processing with Wetwop™

1 Scope

Wetwop™ is used by latent print personnel to develop latent prints on adhesive surfaces. The Latent Print Units use black and white Wetwop™.

2 Equipment/Materials/Reagents

Camel hair brush or other similar small brush

Petri dish or other container

Squirt bottles

Water

Wetwop™ (Black and White)

3 Standards and Controls

Not applicable.

4 Sampling or Sample Selection

Not applicable.

5 Procedures

5.1 Solution Preparation

- a) Shake the bottle.
- b) Pour a small amount of solution into a petri dish or other suitable container.

5.2 Application

- a) Paint the Wetwop™ onto adhesive surface with a camel hair brush or other similar small brush.

- b) Let sit for 15 seconds.
- c) Rinse with a slow stream of water.
- d) Allow to dry.
- e) For digital capture and photography, see FBI Latent Print Units Processing Manual, Preamble.

5.3 Storage

Wetwop™ may be stored in any type of laboratory accepted receptacle away from extreme heat, ignition sources, or open flame.

5.4 Shelf Life

Wetwop™ has an indefinite shelf life provided the reagent check is satisfactory.

5.5 Reagent Checks

See FBI Latent Print Units Processing Manual, Preamble.

6 Calculations

Not applicable.

7 Measurement Uncertainty

Not applicable.

8 Limitations

Not applicable.

9 Safety

See FBI Laboratory Safety Manual for appropriate information.

10 References

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| 1 | 10/02/17 | Updated for Biometrics Analysis Unit. |

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Standard Operating Procedures for Processing Human Remains

1 Scope

These procedures are provided to assist personnel who record friction ridge prints from deceased individuals. This document does not preclude the use of variations of listed procedures for recording prints from deceased individuals. Laboratory resources, technological change, and examiner preference (within the bounds of good laboratory practice and quality control) determine what examination procedures are appropriate and/or acceptable for certain circumstances. The document covers techniques associated with processing human remains in the Laboratory as well as at an off-site location. See the Friction Ridge Discipline Operations Manual, Standard Operating Procedures for Processing Unknown Deceased for examination of the recovered prints and administrative requirements for Laboratory processing.

2 Equipment/Materials/Reagents

Adhesive Lifters

Ammonium Hydroxide/Sodium Bicarbonate Rehydrating Mixture

Bleach (or appropriate cleaning agent)

Boiling Pots (or hot plate and suitable container)

Butane Lighter

Casting Material

Cutting equipment (saws, shears, scalpels)

Digital Capture Device

Dishwashing Liquid

Duct Seal

Embalming Chemicals (conditioner, preservative, restorative)

Fingerprint or Foam Brushes

Fingerprint/Palm Print/Footprint Cards/Strips

Fingerprint Ink

Fingerprint Magnifier

Fingerprint Powder

Isopropyl Alcohol

Leather Conditioner

Sodium Hydroxide Solution (1% to 3%)

Syringes

Tissue Builder

3 Procedures

3.1 Deceased Processing

All human remains should be treated as infectious material and universal precautions should be exercised.

When personnel process human remains, they should:

1. Clean and evaluate the remains.
2. Recondition compromised friction skin, as appropriate.
3. Record prints from remains.

When processing at a non-Laboratory location, any actions that would drastically change the remains or could be misinterpreted as a wound (e.g., removal of digits or cutting tendons) will require permission from the Medical Examiner or other appropriate Medicolegal Authority.

3.1.1 Processing at FBI Laboratory

Human remains will be stored in the refrigerator, freezer, or stainless steel hood in a Biohazard Examination Room, as applicable. The evidence will be properly sealed unless reconditioning techniques are being performed. Any evidence undergoing reconditioning will have a label with the Laboratory number and personnel contact information clearly associated with items in the process of exams.

3.2 Clean and Evaluate Remains

The first step in deceased processing is to clean and evaluate the remains as follows:

- The individual will use care when handling remains, especially charred remains, as the skin may be fragile and easily damaged.
- The individual will gently clean the remains. The individual may use a soft toothbrush or sponge and warm, soapy water or other cleaning solutions (such as bleach) to remove contaminants from the hands or feet.
- Mild or severe rigor may require the individual to forcefully straighten or flatten the remains. Manipulation of the joints will loosen rigor. The individual may also cut the tendons in order to relax the remains.
- The individual will examine the human remains for damage to the friction skin. The type of event will often be a good indicator of the type of damage observed on the remains. If damage exists, the individual will recondition the friction ridge skin.

3.3 Reconditioning Techniques

3.3.1 Macerated Human Remains

Maceration involves damage to the skin through prolonged exposure to moisture. This type of damage may cause swelling and broadening of the friction ridges as well as wrinkling of the skin. Maceration may also cause the separation of the epidermis (outer skin) from the dermis (inner skin) (See Section 3.5.3). This separation is often referred to as “gloving”. The following procedures should be considered when reconditioning macerated friction skin:

- The individual may pinch or stretch the skin to remove wrinkles.
- If the skin is intact, the individual may use tissue builder. The tissue builder is injected into the end joint of the finger by passing the needle through the first joint or medial phalange. Other parts will be processed with tissue builder in a manner to best preserve the friction ridge skin.
- The individual may use the boiling technique. (See Section 3.3.4)
- If gloving has occurred and the epidermis has not completely separated from the dermis, the individual can carefully remove the epidermis (utilizing scissors or scalpels) to facilitate printing. The individual may place the detached epidermis over the individual’s gloved finger or hand to assist in printing.
- If gloving has occurred and the epidermis has separated completely from the dermis, the individual should print both the dermis and epidermis to ensure they are from the same individual. This is especially important in disaster situations with mass casualties.

3.3.2 Desiccated Human Remains

Desiccated or mummified remains are often difficult to work with because the skin is extremely dehydrated, often with severe wrinkling. The following procedures should be considered when reconditioning desiccated friction skin:

- The individual can soak the remains in one of the following solutions:
 - Dishwashing liquid (may be diluted slightly with warm water)
 - Ammonium hydroxide/sodium bicarbonate solution
 - Sodium hydroxide solution
 - Leather conditioner
- Rehydration can take days or weeks depending on the extent of the dehydration and the rehydration solution used. Some solutions (e.g. sodium hydroxide) can be destructive to remains depending on condition and amount of exposure. Individuals should employ extreme caution when using the rehydration techniques.
- To remove wrinkles after rehydration and restore the remains to the approximate natural size/shape, the individual should try to stretch the skin and may inject the finger with tissue builder using a disposable syringe. Tissue builder is injected into the end joint of the finger by passing the needle through the first joint or medial phalange. Other parts will be processed in a manner to best preserve the friction ridge skin.
- If soaking does not soften the skin, the individual may cast the remains using Accutrans or equivalent casting material.
- If friction ridge detail is not visible or the skin has become saturated, the individual may use the boiling technique (See Section 3.3.4) after rehydration.

3.3.3 Burned or Charred Human Remains

The thermal modification of human remains often results in brittle friction ridge skin that can be further damaged through excessive handling. When an individual is burned to death, the body will usually exhibit clenched hands. Clenching of the hands is a natural reaction that tends to protect the friction ridge detail on the fingers and interdigital area of the palm. The following procedures should be considered for reconditioning burned or charred friction skin:

- Instead of forcing the fingers or toes to open, the individual will cut the tendon on the inside of the fingers or toes to gently straighten. Alternatively, and if necessary, the individual will remove the fingers or toes from the hand for better processing. Make sure to obtain permission in the appropriate situations. The individual will carefully remove hardened or partially loose skin by twisting or cutting. Removed skin should be gently cleaned with warm water (which should soften skin).

- Photography is recommended to capture the friction ridges after the skin is cleaned and before any potential further damage is done. However, the individual could attempt other recording methods prior to photography.
- Depending on the condition of the detached skin, the individual may print the underside of the epidermis. It should be noted that the resulting record will be in reverse position and may be in reverse color.
- The individual should remove damaged epidermal skin to allow access to the dermal layer. (See Section 3.5.3)
- The individual may use the boiling technique (See Section 3.3.4) as a last resort to clean the hand and enhance the presence of friction ridge detail.

3.3.4 Boiling Technique

The boiling technique is used in conjunction with the information in Sections 3.3.1 through 3.3.3.

- The individual will dip the remains into boiling water for approximately five to ten seconds.
- The individual will remove the remains from the boiling water and examine the condition of the friction ridge detail.
- The individual will repeat as necessary, but no more than three times due to increased chance of destroying the friction ridge skin.
- Alternately, when there is abrasion trauma to the skin, the individual could indirectly apply the hot water to the hand, such as with a sponge, to reduce the chance of additional trauma to the skin.
- The boiling method can be attempted on the epidermis and the dermis, but is designed to enhance dermal ridges and may cause the epidermis to blister.

3.3.5 Drying Techniques

Prior to recording prints from the skin, the individual must ensure the skin is dry. The following drying techniques may be used as warranted by the condition of the remains. The individual could:

- Blot the remains dry using low lint absorbent wipes or cloth towels.
- Apply isopropyl alcohol to the remains and blot with low lint absorbent wipes or cloth towels.
- Use a blow dryer on low heat to dry the remains.
- Use the flame technique which involves moving the flame from a butane lighter across the skin for several seconds until dry (taking care not to char the skin). Care should be taken when applying this technique as it may damage the skin.

3.4 Recording Postmortem Prints

Initially, the individual may record as few friction ridge prints as necessary from the remains and attempt to identify. If the individual is not identified, an attempt must be made to record all friction ridge skin detail on the hands, to include palms. It is at the individual's discretion whether to record all detail ahead of time to attempt identification or to record the minimum necessary to attempt identification. The individual may print the feet as dictated by the circumstances. These parts will be handled similarly as described for friction ridge prints from the hand listed above.

The individual will place physical postmortem print record(s) obtained directly from human remains in a sealable storage bag, and be labeled appropriately for bio-hazard.

3.4.1 Digital Scanning Device

Images of friction ridge skin may be captured digitally using a scanning device or software (e.g., ARES software). The friction ridges will be captured by placing or rolling the finger directly on the device to digitally record the ridges. Direct captures are in correct position and may be in reverse color.

3.4.2 Lifting or Casting

The recommended analog method involves the use of black powder and white adhesive lifters. The adhesive lifters can be commercial products or any type of product with a sufficient adhesive to lift the print without damaging the skin. Each part is processed separately as follows:

- The individual will lightly coat the ridges with the powder using a camel or squirrel hair fingerprint brush (or equivalent) or a foam brush, as appropriate.
- The individual will place the part on an adhesive lifter cut to the approximate size of the remains. Duct seal or equivalent may be used to assist with the capture of the print.
- The individual will affix the recorded impression to the back of a transparent fingerprint card or other transparent material. A transparent fingerprint card can be created by photocopying a standard fingerprint card onto transparency film.
 - Prints should be in correct position and in correct color.

Alternatively, the individual could use casting materials or ink and a traditional card. All prints should be in correct position and in correct color.

3.4.3 Camera Capture of Friction Ridges

Recordings of friction ridge skin may be captured via camera. Proper selection of lighting schemes or the use of oblique lighting may enhance the friction ridge detail. A scale or other measurable item should be included in the image if the capture is not already 1:1. Direct captures of friction ridge skin will be in reverse position and may be in reverse color. Individuals may wish to capture images of friction ridges before and/or after techniques are applied.

3.4.4 Required Information for Postmortem Records

Each resulting postmortem record captured by an individual in the Friction Ridge Discipline will contain the following information:

- Available biographical or physical information of the deceased.
- Signature of individual(s) recording prints.
- Date the prints were recorded.
- Any additional information deemed necessary (e.g., Medical Examiner number).
- A Laboratory number, if applicable.
- The source of each postmortem print(s) (e.g. finger number), if known.
- Notations if any parts (i.e., fingers or palms) are missing, damaged, or unable to be printed.

3.5 Additional Deceased Processing Considerations

3.5.1 Detached Digits

When the hand is received intact and the fingers need to be disarticulated, the individual will remove the fingers and place each finger in separately labeled containers bearing the finger number and include the Laboratory number or remains number, as applicable. When working in the field, the individual will obtain permission from the chief Medicolegal Authority prior to removing clothing or body parts. When working in the Laboratory, the individual may process as he or she deems necessary.

When fingers are received detached, the individual will place each finger in an appropriately labeled container (add finger number, if known, and include the Laboratory number or remains number, as applicable).

The same concept can be used with feet and toes.

3.5.2 Gloved Skin

When printing gloved skin, the individual should use either adhesive lifts or ink and card strips, as described above. Casting materials and photography may also be used to capture the friction ridges. Depending on the quality, it is also possible to record the underside of the epidermis; however, the resulting prints will be in reverse position and may be in reverse color.

Detached skin may be retained in original container with the associated part or be placed in a separate appropriately labeled container (origin of skin (e.g., finger number), if known, and include Laboratory number or remains number, as applicable).

3.5.3 Dermal Skin

In certain circumstances, when the epidermis is damaged or lost, the dermal skin may be recorded. All reconditioning techniques may be used on dermal skin. The resulting prints may have either 1) a double row of dermal papillae, 2) single rows created by two semi-fused rows of dermal papillae, or 3) a combination of double rows and single fused rows, all of which represent a single epidermal ridge. The individual must account for this when comparing or searching the print.

3.6 Disposition of Human Remains

Human remains are not to be destroyed, even when requested by the contributor.

For FBI Laboratory cases, the following procedures will be followed:

- Ensure biohazard labels are on evidence container(s).
- Ensure that the remains are in leak proof primary and secondary containers.
- Return the remains to the contributing agency.

4 Safety

The following safety procedures will be followed as applicable:

- Conduct work in a Biohazard Examination Room or area.
- Utilize universal precautions for control measures.
- Use barrier protection at all times (gloves, masks, eye wear, disposable lab coat/apron).
- Always remove protective barriers prior to leaving a Biohazard Examination Room or area and place disposable barriers in a biohazard disposal container.
- Use double gloves when there may be hand contact with blood or other potentially infectious materials.
- Change gloves when contaminated, torn, punctured, or when their ability to function as a barrier is compromised.

- Wear goggles or glasses with face shields or full face shields to protect from splashes, sprays, spatters, droplets of blood, or other potentially infectious materials.
- Use a disposable lab coat and/or apron for splash protection or replace lab coats after use.
- Wash hands after removal of gloves or other personal protective equipment.
- Place contaminated needles/sharps in appropriate puncture-resistant container.
- Reduce the use and handling of needles and sharp instruments as much as possible.
- Avoid bending, recapping, removing, or otherwise handling contaminated needles or other sharps.
- If necessary, accomplish recapping or needle removal through the use of a mechanical device or a one-handed technique. Use disposable needles whenever possible.
- Minimize spills and splatters.
- Decontaminate all surfaces and devices after use (10% bleach solution, alcohol, or other disinfectant cleaning solution).
- Wash surfaces and devices with water after decontamination.
- Use biohazard labels as required.
- Use leak proof primary and secondary containers during collection, handling, processing, storage, transport, or shipping of biohazard material.
- Dispose of infectious waste in a biohazard bag.
- Maintain the biohazard bag in a rigid container.
- Refer to the FBI Laboratory Safety Manual for guidance on safety policies and chemical disposal. Any questions will be referred to the Health and Safety Group.

5 Standards and Controls

Not applicable.

6 Sampling

Not applicable.

7 Calculations

Not applicable.

8 Measurement Uncertainty

Not applicable.

9 Limitations

Not applicable.

10 References

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|--------|------------|--|
| 1 | 10/02/17 | Updated for Biometrics Analysis Unit. Section 5.1, changed “he/she” to “they”. Section 5.3.4, removed “also” and “both” in last bullet. Section 5.4.1.3, title modified. Section 5.4.2, last sentence, clarified. |
| 2 | 04/17/20 | Latent Print Units changed to Friction Ridge Discipline throughout document as well as other appropriate changes with similar terms. Minor wording, grammar, reorganization of material, and punctuation changes in document. Changed examiner to individual throughout document. Reorganized sections and renumbered appropriately. Streamlined information in sections. Added clarification to Section 1. Section 2, limited list to primary chemicals and equipment, eliminated peripherals, added new chemical, and combined similar types. Section 3.1, added “as appropriate” to number 2 and added last paragraph. Section 3.1.1, generalized location of information. Section 3.2, reorganized information in section for better flow. Section 3.3.2, added notice on destruction with solutions and removed comment on container. Section 3.3, clarified area of protection and added warning on permission and damage. Section 3.3.4, added epidermis warning. Section 3.3.5, added warning. Section 3.4, added first paragraph and second moved from other location in document. Section 3.4.1, title changed and information updated. Section 3.4.2, consolidation and updating of information. Added Section 3.4.3. Section 3.5.1, title changed and contents streamlined. Section 3.5.2, added last paragraph. Section 4, updated. |

Approval

Redacted - Signatures on File

Friction Ridge Discipline
Technical Leader

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Date: 04/16/2020

Latent Print Operations
Unit Chief

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Date: 04/16/2020

Acting Latent Print Support
Unit Chief

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Date: 04/16/2020

Acting Scientific and
Biometrics Analysis Unit Chief

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Date: 04/16/2020

Standard Operating Procedures for Latent Print Processing with 1,2-Indanedione-Zinc

1 Scope

This procedure will be used by latent print personnel to develop latent prints on porous and semi-porous surfaces. 1,2-Indanedione-zinc reacts with the amino acids that are present in perspiration. Developed latent prints may fluoresce under a Forensic Light Source(s).

2 Equipment/Materials/Reagents

Beakers or graduated cylinders

Balance

Spatula

Squirt bottles, sprayers, brushes, or glass trays

Dark glass bottles

Magnetic stirrer and stir bar(s)

Humidity cabinet, oven, or iron

1,2-Indanedione

Zinc Chloride

Glacial Acetic Acid

Absolute Ethanol

Ethyl Acetate

Petroleum Ether

Methanol

Forensic Light Source(s)

Fume Hood

Humidity Monitor

3 Standards and Controls

See FBI Latent Print Units Processing Manual, Preamble.

The humidity monitor will be checked to ensure proper performance.

4 Sampling or Sample Selection

Not applicable.

5 Procedures

5.1 Solution Preparation

a) Zinc Chloride Stock Solution

- 6.4g zinc chloride
- 160mL absolute ethanol
- 16mL ethyl acetate
- 3040mL petroleum ether

b) 1,2-Indanedione Stock Solution

- 32g 1,2-indanedione
- 3600mL ethyl acetate
- 400mL glacial acetic acid

The 1,2-indanedione stock solution should be stirred for 20 minutes so that the 1,2-indanedione is completely dissolved.

c) Working Solution

- 400mL 1,2-indanedione stock solution
- 320mL zinc chloride stock solution
- 3280mL petroleum ether

The chemicals for each solution should be mixed thoroughly in the order listed. Bottles must be clean and dry. Before using a new bottle, it should be washed with methanol so that moisture is removed and the bottles are clean.

5.2 Application

- a) Personnel will apply working solution to specimen by spraying, dipping, squirting, or painting.
- b) Personnel will allow specimen to dry completely.

- c) Personnel will review the humidity monitor in the area of application.
- i) If the ambient humidity in the area of application is less than 23%, personnel will use the humidity cabinet for acceleration. Personnel will place the item(s) in a humidity cabinet at 50-80% humidity and 60°C - 80°C for 15 minutes.
 - ii) If the ambient humidity in the area of application is equal to or more than 23%, personnel will use the dry oven. Personnel will place the item(s) in a dry oven at approximately 100 °C for 20 minutes.

5.2.1 Alternate Methods for Development

- a) Personnel may apply steam with iron. If latent print development is insufficient, personnel will continue to apply steam until no additional development seen.
- b) Personnel may apply heat with dry iron. If latent print development is insufficient, personnel will continue to apply heat until no additional development seen.
- i) If steam or dry iron are used as a development method, a control sample must be successfully tested using the chosen alternate method prior to using the reagent in casework. After the initial successful test, the reagent must be checked every 24 hours or if conditions warrant additional checks. The check will be noted in the case record.
 - ii) In some circumstances, heat may be detrimental to the condition of the specimen(s). In these circumstances, the specimen(s) may be placed in a sealed bag or container and left at room temperature/humidity until development occurs. No control test is warranted.

Note: The use of alternate methods must be recorded in the case record.

5.2.2 Personnel will view the item(s) using a Forensic Light Source(s) with optimal wavelengths ranging from 500nm to 555nm (Refer to FBI Latent Print Unit Processing Manual, Standard Operating Procedures for Latent Print Processing with Forensic Light Sources). For digital capture and photography, see FBI Latent Print Unit Processing Manual, Preamble.

Note: Manila envelopes, brown paper bags, cardboard, Kraft paper, and most yellow legal pad paper may be better viewed using a barrier filter ranging from 570nm to 590nm.

5.2.3 Processing Outside Laboratory Building

A humidity monitor is not required when personnel process items outside of the controlled setting of the Quantico or Huntsville Laboratory buildings. If a humidity monitor is not used, a control sample must be successfully tested prior to using the reagent in casework. After the initial successful test, the reagent is checked every 24 hours or if conditions at the location warrant additional checks. All reagent checks are noted in the case record.

5.3 Storage

- a) Stock solutions must be stored in a dark glass bottle.
- b) Working solution may be stored in any of the following receptacles:
 - Metal can
 - Stainless steel container
 - Dark glass bottle

6 Calculations

Not applicable.

7 Measurement Uncertainty

Not applicable.

8 Limitations

Fluorescent compounds will suffer from loss of fluorescent intensity over time, as such fluorescent prints will be captured as soon as practicable.

9 Safety

This process must be prepared and used in a fume hood or well ventilated area.
See FBI Laboratory Safety Manual for appropriate information.

10 References

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|--------|------------|--|
| 1 | 10/02/17 | Section 1, updated name. Section 5.2c, extended range and added oven. Added Section 5.2.1 b. Added location to Section 5.2.1. Section 5.3, minor punctuation change. References and documents updated. |
| 2 | 09/27/18 | Section 1, minor wording correction. Section 2, added humidity monitor. Section 3, moved Section 5.4 content to this section and added humidity monitor check. Section 5.2, added "Personnel will" to beginning of most statements. Section 5.2c, added information on when to use humidity cabinet or dry oven. Updated Section 5.2.1 to add "Personnel may" to applicable statements and to update for checks. Section 5.2.2, minor wording modification. Section 5.2.3 added. |

Approval

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Date: 09/25/2018

Latent Print Operations
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Date: 09/25/2018

Latent Print Support
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Date: 09/25/2018

Biometrics Analysis
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Date: 09/25/2018

QA Approval

Quality Manager

Date: 09/25/2018

Standard Operating Procedures for Latent Print Processing with Small Particle Reagent (SPR)

1 Scope

Small Particle Reagent (SPR), also known commercially as WetPrint[®], is an aqueous solution used to develop sebaceous latent prints on submerged firearms. SPR is commercially available in both white or black (dark) formulations.

2 Equipment/Materials/Reagents

Spray bottles or glass trays

Water

Small Particle Reagent (White or Black/Dark)

3 Standards and Controls

Not applicable.

4 Calibration

Not applicable.

5 Sampling

Not applicable.

6 Procedures

6.1 Working Solution Preparation

a) Follow manufacturer's instructions.

Note: Container should be frequently shaken during processing to re-suspend solids.

6.2 Application

- a) Remove firearm from water. Do not dry the specimen.
- b) Use only premade solutions of SPR.
- c) Use the SPR solution according to the manufacturer's instructions.
- d) A copy of the instructions, to include manufacturer and Lot number (if available), will be retained in the case record.
- e) Capture developed latent prints as appropriate.
- f) Replace firearm in water upon completion of processing.

Note: If development is not sufficient, the SPR solution can be reapplied to the specimen.

6.3 Storage

SPR solutions can be stored in original containers.

6.4 Shelf Life

SPR solutions have an indefinite shelf life provided the reagent checks are satisfactory.

Note: If working solution is separated, shake vigorously. If solution does not return to suspension, discard solution down laboratory drain.

6.5 Reagent Checks

See Latent Print Unit Processing Manual, Preamble, Section 3.1.

7 Calculations

Not applicable.

8 Uncertainty of Measurement

Not applicable.

9 Limitations

Developed prints will be photographed immediately as drying of the specimen may cause the prints to fade and rust formation can be detrimental to firearms examinations.

10 Safety

Testing has demonstrated that the pH of SPR solutions generally falls between 2 and 12.5; therefore, this solution will be disposed of down laboratory drain (see Latent Print Unit Processing Manual, Preamble, Section 8).

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|--------|------------|---|
| 0 | 12/18/13 | Original document issued. |
| 1 | 01/13/14 | Section 6.5, removed section duplicated in Preamble and replaced with reference. Section 10, added last line. Section 11, modified last entry to conform with current updated document. |

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Approval

LPOU Chief

Date: 01/09/2014

LPSU Chief

Date: 01/09/2014

QA Approval

Quality Manager

Date: 01/09/2014

Issuance

Standards and Practices
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Date: 01/09/2014