Drug Enforcement Administration

Office of Forensic Sciences

Latent Print Examination Manual

May 2020

Date Posted: May 15, 2020

Table of Contents

Approval:
Deputy Assistant Administrator: Redacted Date: Redacted
Nelson A. Santos

CHAPTER 1 – QUALITY ASSURANCE

1.0 Quality Assurance

1.1 Scope

The quality assurance program for the fingerprint program includes:

A. Testing proficiency

B. Peer review

C. Validating techniques and procedures

D. Maintaining equipment

1.2 Definitions

A. Terminology used in the Latent Print Examination Manual (LPEM) is defined in Appendix 1A.

B. Symbols, acronyms, and abbreviations are defined in Appendix 1B.

C. Policy statements within the LPEM are mandatory requirements, and the word “must” is to be presumed, except as noted below:

1. The word *should* within a statement signifies a best-practice or recommendation.
2. The word *may* in a statement provides permission that does not require additional authorization.
3. The phrase *may not* and the word “cannot” are prohibitive language intended to clarify that an action is impermissible.

NOTE: Unless expressly prohibited elsewhere in the LPEM, the Laboratory Director (LD) may request exemptions to policies and procedures from Office of Forensic Sciences (SF).

2.0 Proficiency Testing Program

The Proficiency Testing Program (PTP) is comprised of two components:

A. Latent print comparison (See 2.1)

B. Latent print processing (See 2.2)

2.1 Latent Print Comparison Proficiency Test

2.1.1 Responsibilities

The LD or designee:

A. Ensures each Fingerprint Specialist (FS) completes at least one latent print comparison proficiency test each fiscal year.

B. Orders one Latent Print Comparison Examination test for each FS.

NOTE 1: One comparison proficiency test is assigned to satisfy the external proficiency test program (EPTP) requirement per laboratory.

NOTE 2: Remaining comparison proficiency tests are assigned to all FSs for examination and internal review.

2.1.2 Procedures

The FS:

A. Receives the assigned comparison proficiency test participant code from the laboratory quality assurance manager (LQAM) or designee.

B. Downloads all test materials from the external provider website.

C. Saves all images from the comparison proficiency test and fingerprint specialist notes (e.g. handwritten notes and fingerprint charts) into the digital imaging system under the comparison proficiency test participant code and FS initials.

D. Completes Latent Print Matrix Report/DEA-466b. (See Office of Forensic Sciences Document Control Center (SFDCC)/Blank Forms)

E. Completes Latent Print Examination Report (LPER)/DEA-111. (See SFDCC/Blank Forms)

F. Returns the completed external provider data sheets, Latent Print Matrix Report, and LPER to the supervisory fingerprint specialist (SFS).

The SFS:

G. Determines which FS will complete the external proficiency test and further coordinates with the LQAM or designee.

H. Conducts all verifications, technical and administrative reviews on all proficiency tests.

I. Reviews the external provider data sheets and FS documentation associated with the proficiency test for any discrepancies.

J. Brings any discrepancies to the attention of the LQAM or designee.

K. Discusses any difference of opinion with the FS and if an agreement cannot be reached, refers to Conflict Resolution. (See 2-7.4)

L. Submits all completed external provider data sheets to the LQAM or designee.

The LQAM or designee:

M. Assigns comparison proficiency test participant code to each FS.

N. Returns the selected external provider data sheets within the established time limits to satisfy EPTP requirements.

O. Authorizes the test provider to release the results to the accrediting body.

P. Forwards a complete report of examination to SF once results are returned to the test provider.

Q. Attaches the external provider data sheets into Laboratory Information Management System (LIMS) Case Management, Case Attachments - Fingerprint Attachments.

R. Maintains all completed comparison proficiency data sheets and documentation at the laboratory for five years.

The SF Quality Assurance Manager (SFQAM) or designee:

S. Authorizes the destruction of external and internal comparison proficiency tests through the quarterly PTP report.

T. Monitors the results of analysis and notifies the LQAMs of potential inconsistencies. (See Laboratory Operations Manual (LOM) 71)

2.2 Latent Print Processing Proficiency Test

2.2.1 Procedures

The LD or designee:

A. Ensures each FS completes at least one latent print processing proficiency test during each accreditation cycle.

B. Orders one Latent Print Processing Examination test for each FS.

NOTE 1: One processing proficiency test is assigned to satisfy the external proficiency test program (EPTP) requirement per laboratory.

NOTE 2: Remaining processing proficiency tests are assigned to all FSs for examination and internal review.

2.2.2 Procedures

The FS:

A. Receives the assigned processing proficiency test from the evidence vault and completes the LIMS tests listed below:

    1. Description of Evidence
    2. Fingerprint Examination
    3. Evidence Disposition

B. Prints out the Latent Print Details Report (LPDR).

C. Selects “Examiner Report Not Needed” in LIMS Examiner Report.

D. Returns the evidence container to the evidence vault.

E. Returns the completed external provider data sheets and the LPDR to the SFS.

The SFS:

F. Reviews the external provider data sheets and LPDR associated with the proficiency test for any discrepancies.

G. Brings any discrepancies to the attention of the LQAM or designee.

H. Submits all completed external provider data sheets and LPDR to the LQAM or designee.

The LQAM or designee:

I. Assigns processing proficiency test to each FS.

J. Returns the selected external provider data sheets within the established time limits to satisfy EPTP requirements.

K. Authorizes the test provider to release the results to the accrediting body.

L. Forwards a complete report of examination to SF once results are returned to the test provider.

M. Maintains all completed processing proficiency data sheets and documentation at the laboratory for five years.

The SFQAM or designee:

N. Authorizes the destruction of external, internal comparison, and processing proficiency tests through the quarterly PTP report.

O. Monitors the results of analysis and notifies the LQAMs of potential inconsistencies. (See Laboratory Operations Manual (See LOM 71)).

3.0 Peer Review of Fingerprint Specialist Examinations

3.1 General Requirements

A. A minimum of six peer reviews for each FS and SFS per fiscal year will be conducted from each of the following categories:

1. Processing
2. Analysis/Comparison

B. A minimum of two peer reviews for each FS and SFS per fiscal year will be conducted on Automated Fingerprint Identification System (AFIS)

C. A minimum of six additional SFS processing reviews will be conducted for each FS per fiscal year.

NOTE 1: SFSs not conducting routine latent print examinations will not be held to minimum requirements from each of the categories.

NOTE 2: Peer reviews will be conducted on all SFS exhibits if the minimum requirements cannot be met in the fiscal year.

3.2 Responsibilities

The SFS:

A. Assigns peer reviews to each FS.

1. Processing Peer Reviews are to be assigned at the time the exhibit is assigned to the FS for processing.
2. Comparison and AFIS Peer Reviews are to be assigned after the technical review and before the administrative review is conducted on the LPER.

B. Conducts peer review examinations (processing, comparison, and AFIS) when there are no FSs available.

C. Conducts six (at a minimum) SFS processing reviews for each FS per fiscal year.

D. Conducts peer reviews in accordance with 1-3.3.

E. Refers to Conflict Resolution if a difference of opinion cannot be resolved. (See 2-7.4)

F. Forwards the completed Latent Print Peer Review Form to the Quality Assurance Specialist (QAS).

The reviewing FS:

G. Conducts peer reviews in accordance with 1-3.3.

H. Refers to Conflict Resolution if a difference of opinion cannot be resolved. (See 2-7.4)

I. Forwards the completed Latent Print Peer Review Form to the SFS.

The QAS:

J. Maintains the Latent Print Peer Review Form files for five years.

3.3 Conducting Peer Reviews

3.3.1 Processing Reviews

The reviewing FS/SFS:

A. Verifies proper processing techniques were applied.

B. Examines the evidence after each processing step.

C. Examines the test print after each step to confirm reagent and equipment are working properly.

D. Reviews the LPDR.

E. Verifies all potential identifiable latent prints developed on the evidence were preserved.

F. Completes the Latent Print Peer Review Form – Processing Review. (See SFDCC)

3.3.2 Analysis/Comparison Reviews

The reviewing FS/SFS:

A. Re-evaluates suitability for all latent prints that were preserved.

B. Evaluates and verifies all comparisons (source identifications, source exclusions, and inconclusive).

C. Reviews the DEA-466b for documentation of impression type, comparison result(s), identification(s), verification(s), identifier initials, verifier name, and dates.

D. Completes the Latent Print Peer Review Form – Analysis/Comparison Review. (See SFDCC)

3.3.3 Automated Fingerprint Identification System Reviews

The reviewing FS/SFS:

A. Reviews all AFIS search documentation.

B. Conducts a re-comparison of all images from the candidate list.

C. Reviews the DEA-466b for documentation of AFIS searches and results.

D. Reviews AFIS generated documentation. (See 2-7.7.1)

E. Completes the Latent Print Peer Review Form – AFIS Reviews. (See SFDCC)

3.3.4 Single Image Review

If only one area of friction ridge detail has been captured (preserved) and not identified in the exhibit, it will be reviewed by the technical reviewer.

The Technical Reviewer:

A. Completes the Single Image Reviewer Form. (See SFDCC)

B. Attaches the Single Image Reviewer Form (PDF) into LIMS Case Management, Case Attachments - Fingerprint Attachments.

C. Resolves differences in technical opinions through the Conflict Resolution process. (See 2-7.4)

4.0 Validating Latent Print Development Techniques and Procedures

4.1 Responsibilities

The LD or designee:

A. Ensures that latent print development techniques or procedures are validated before use in casework.

B. Maintains validation documentation in the format posted on the SFDCC.

C. Forwards a copy of the validation documentation to the SF for posting on the SFDCC.

4.2 Validation of Techniques or Procedures for Developing Latent Print Detail

The FS:

A. Performs a thorough review of publications, academic materials, safety procedures and protocols, etc., involving the technique or procedure.

B. Uses the Friction Ridge Development Technique Validation Final Report form to document the validation. (See SFDCC)

4.2.1 Standard Samples

The FS selects samples representative of the type of specimens routinely analyzed by the technique or procedure.

4.2.2 Reproducibility

The FS performs the technique or procedure on each test sample to demonstrate consistent results.

4.2.3 Ruggedness

A FS that did not perform the reproducibility must be able to reproduce the test results using the same technique or procedure.

4.2.4 Environmental Studies

The FS evaluates the effect of environmental conditions on a technique or procedure by exposing known samples to a variety of conditions prior to development.

4.2.5 Accuracy

The FS determines that the technique or procedure develops latent prints with sufficient detail to allow another qualified FS to evaluate the results and conduct a comparison.

5.0 Fingerprint Equipment

5.1 Equipment

A FS will examine the following fingerprint equipment upon receipt/installation in the laboratory to determine if it is functioning according to manufacturer's specifications:

1. Laser
2. Alternate Light Source
3. Reflective Ultraviolet Imaging System (RUVIS)
4. Environmental Chamber
5. Cyanoacrylate Chamber
6. Digital Imaging System and Workstation
7. Photography Print Processor
8. AFIS Workstations
9. Full Spectrum Imaging System (FSIS)

5.2 Documentation Requirements

The LD or designee:

A. Specifies the format of the equipment logbook.

B. Archives the equipment logbook in the laboratory for 75 years.

The FS:

C. Keeps an equipment logbook for each piece of equipment listed. (See 1-5.1)

D. Includes in the logbook, at a minimum, the following:

1. The identity of the item of equipment and its software.
2. The manufacturer's name, type identification, and serial number or other unique identification.
3. The current location.
4. The manufacturer's instructions, if available, or reference to their location.
5. Dates, results, and copies of reports and certifications of all adjustments, acceptance criteria, and the due date of next service.
6. The maintenance plan and maintenance carried out to date.
7. Any damage, malfunction, modification, or repair of the equipment.

E. Verifies operation of environmental (humidity and temperature) chambers, fuming chambers, and forensic light sources by performing a test print and recording the results in LIMS.

F. Removes equipment from service when not operational and documents it in the equipment logbook.

G. Places a "Not in Service" sign on the affected equipment to notify potential users of its status.

H. Documents all steps to resolve the equipment problems in the logbook.

I. Documents the date when equipment is repaired and placed back into service.

6.0 Reagent Reliability

6.1 Documenting Reagents

6.1.1 Stock Reagents

The FS records the following information on the Reagent Reliability – Stock/Working Solution form for each stock (primary) reagent prepared: (See SFDCC)

1. Reagent Name
2. Laboratory Traceable Number (reagent-sequence number-date prepared including month, day, and year (e.g., R6G-1-9/1/2015))
3. Preparer Initials
4. Amount Prepared
5. Test Print Result (Positive/Negative)
6. Expiration Date (if applicable)
7. Date Stock Depleted
8. FS Initials

6.1.2 Secondary Container

The FS records the following information on the Reagent Reliability – Stock/Working Solution Form for each secondary container prepared from a verified stock reagent. (See SFDCC)

1. Reagent Name
2. Laboratory Traceable Number (See 6.1.1)
3. Prepared Date

6.1.3 Commercial (Purchased) Reagents

The FS records the following information on the Reagent Reliability – Commercial Reagents Form once the manufacturer's seals are broken on a commercial reagent. (See SFDCC)

1. Reagent Name
2. Laboratory Traceable Number (See 6.1.1)
3. Date Opened
4. FS Initials (upon opening)
5. Manufacturers Reported Reagent Volume
6. Test Print Result (positive/negative)
7. Expiration Date (if manufacturer provided)
8. Date Depleted
9. Final Disposition
10. FS Initials (upon disposal)

6.2 Labeling Containers

The FS labels the reagent containers as follows:

	Reagent Name	FS Initials	Prepared Date	Lab Traceable Number	Date Opened
Stock Container	X	X	X	X	
Secondary Containers	X		X	X	
Commercially Prepared Containers	X	X		X	X

6.3 Disposing Reagents

The FS:

A. Disposes a reagent as hazardous waste when it meets any of the following criteria (See LOM 78):

1. Does not produce expected results during verification.
2. Drastically changes in appearance or composition.
3. Is no longer needed.

B. Maintains reagents that have reached their expiration date, if able to demonstrate that the reagent continues to work as expected.

CHAPTER 2 – EVIDENCE ANALYSIS

1.0 Evidence Analysis

1.1 Scope

A. This chapter contains the policy and procedures for developing friction ridge detail on evidence, friction ridge examination, digital imaging, and AFIS searches.

B. Laboratory management must approve all deviations that do not meet minimum requirements.

C. Laboratory management, Special Agent (SA), Diversion Investigator (DI), or Task Force Officer (TFO) must authorize all deferred examinations.

D. Deviations and deferred examinations require documentation in LIMS Case Management, Case Attachments - Fingerprint Attachments.

The FS:

E. Uses standard reporting language (SRL) in Examination Results and Conclusion section of the DEA-111 as shown in Appendix 2A.

F. Uses standard operating procedures (SOPs) for latent print processing as defined in Appendix 2E.

G. Examines friction ridge detail as described in Appendix 2B.

H. Follows Department of Homeland Security (DHS) Guidelines on AFIS submissions in Appendix 2C for AFIS requests to DHS.

I. Follows Department of Justice (DOJ) Approved Uniform Language for Testimony and Reports (ULTR).

2.0 Evidence Handling

2.1 Determining Gross Weight of Evidence

The FS:

A. Determines the gross weight of drug evidence received from the vault before separation by the Forensic Chemist (FC). (See 2-2.2)

    1. Records the gross weight in the Gross Weight – Latent Print (LP) Test.
    2. Compares the obtained gross weight with the submitted gross weight. A witness is required if the weight differs by more than two grams or 0.2% of the gross weight of the evidence package, whichever is greater, from the reported weight of the submitting SA, TFO, or DI if there is no gross weight recorded either on the evidence package or on the Report of Drug Property Collected, Purchased, or Seized (DEA-7).
    3. Another LIMS user witnesses the evidence gross weight, prior to breaking the seal, by entering one's username and password in the *Gross Weight* test.
    4. Refers the weight discrepancy matter to the SFS or another laboratory manager to take appropriate follow-up action, which may include referral to the Office of Professional Responsibility (OPR).

B. Does not determine the gross weight of evidence received from the vault after separation by the FC.

C. Does not determine the gross weight for bench transfers.

D. Does not determine the gross weight for non-drug evidence.

2.2 Opening and Resealing Evidence

The FS:

A. Opens the plastic sealed evidence envelopes (PSEE) by cutting along the edge opposite the SA, TFO, DI, or FC evidence seal to create a separate strip.

    1. Annotates FS initials, date opened, and unique identifier (LIMS case number) on this strip.
    2. Places the strip cut from the PSEE inside the original PSEE.

B. Annotates the affixed evidence label with the date opened and any other applicable information.

C. Records the date opened in the LIMS Description of Evidence - LP Test and completes the "Opened By" and "Date Opened" fields on the affixed evidence label. Marks secondary container(s) inside original packaging containing specimens for processing with FS initials, date opened, and unique identifier.

D. Adds additional container(s) in LIMS Description of Packaging – LP Test.

E. Properly marks specimens after examination with the FS's initials, date, and a unique identifier.

    1. Alternately, places multiple specimens into a secondary container(s) marked with the FS's initials, date, and a unique identifier.

F. Places latent print evidence (lifts, non-rewriteable optical media, cut outs, photographs that are developed or preserved) in a new secondary container(s) marked with the FS's initials, date, and a unique identifier.

    1. Adds the additional container(s) in LIMS Evidence Disposition - LP Test – Remarks when added by the FS. (See 2-2.5)

G. Places the specimens and/or secondary container(s) into the original PSEE.

H. Places an evidence seal bearing the FS's signature, the date of sealing, the Investigating Agency (IA) Case Number, the IA Exhibit Number, and unique identifier on the outside of the PSEE, at the bottom, center edge, parallel with the opening.

I. Heat-seals the open end of the PSEE, and inspects the integrity of the seal or reseals the original package(s) with fiber reinforced tape.

NOTE 1: Completely encircles the box or package(s) with the fiber-reinforced tape in two opposing directions that cross each other and places an evidence seal bearing the FS's signature, the date of sealing, IA Case Number, IA Exhibit Number, and unique identifier at the junction where the tape ends meet.

NOTE 2: Ensures that part of the evidence seal adheres to the box or package and covers the fiber-tape junction.

J. Records the date sealed in LIMS Evidence Disposition - LP Test, and completes the "Resealed By" and "Date Resealed" fields on the affixed evidence label.

K. Records a description of the evidence disposition in the LIMS Evidence Disposition – LP Test finding.

L. Records the weight after completion of the evidence processing, if the exhibit contains a suspected controlled substance.

    1. Weighs the properly resealed evidence container to determine the gross weight.
    2. Records the weight on the affixed evidence label and in the LIMS Gross Weight after Analysis – LP Test.

2.3 Improperly Sealed Evidence

A. The FS notifies a manager when evidence is not packaged in accordance with REDACTED (e.g., the SA's seals are not intact).

B. The SFS or designee decides if the evidence will be returned to the vault or be examined.

2.4 Describing the Evidence

The FS:

A. Compares the physical evidence with the description from the DEA-7 or Non-Drug Evidence Laboratory Analysis Report (DEA-7b) and, if it differs significantly from the description reported,

selects “No” in the Consistent with Paperwork finding in the Description of Evidence - LP Test. Completes the Paperwork Inconsistency Description – LP Test.

1. A FS or another LIMS user witnesses the FS description.
2. In the Description of Evidence – LP Test, the witness enters their username and password to document the witnessing of the description discrepancy.

B. Contacts the SA, TFO, or DI in an attempt to resolve any significant differences.

EXCEPTION: The FS is not required to report significant differences from the DEA-7 for evidence previously separated by the FC.

C. Records communication in LIMS in the Case Communications Log, DEA-466c, or email attachment(s).

D. Attaches DEA-466c forms or email attachments into LIMS Case Management, Case Attachments - Fingerprint Attachments.

2.5 Creating Evidence Containers

2.5.1 Fingerprint Unit - Additional FIN Unit

The FS:

A. Creates a FIN unit when evidence is received from the FC (bench transfer) or when drug evidence is received from the vault before analysis by the FC.

1. When no friction ridge detail was developed or observed, inserts a piece of paper with the appropriate SRL used on the final report or inserts an overall photograph of the evidence into a new PSEE. (See Appendix 2A)
2. When friction ridge detail was developed or observed, inserts digital workplace printouts, DVD, DVD-R, Compact Disc/Record (CD-R), cutouts, latent lift cards, or fingerprint evidence (separated) in a new PSEE.

B. Properly seals the new PSEE and places an evidence seal on the package bearing the FS’s signature, the date of sealing, the IA Case Number, the IA Exhibit Number, and the LIMS Case Number.

C. Selects “Add” through Organize My Work (LIMS), creates Lab Exhibit, and places in new container.

D. Uses the Container Code “Fingerprint.”

E. Prints a FIN container label(s) for newly created container(s) and affixes the container label(s) to the new container(s).

2.5.2 Repackaging Evidence in New Container

The FS:

A. Creates a new container(s) when the original evidence cannot be repackaged into the original container(s) and places the original container within the new container.

B. Selects the correct Container Type, Container Code, and the number of new containers.

C. Properly seals the evidence packaging, and places an evidence seal on the package bearing the FS's signature, the date of sealing, the IA Case Number, the IA Exhibit Number, and the LIMS Case Number.

D. Selects "Add" through Organize My Work (LIMS), Evidence Containers.

E. Uses the Container Code "Fingerprint."

F. Prints a FIN container label(s) for the newly created container(s) and affixes the label to the new container(s).

2.6 Returning Completed Evidence to the Vault

The FS returns the completed evidence to the vault in accordance with LOM 73.

2.7 Assessing Evidence Returned from Court

2.7.1 Non-Intact Exterior Evidence Seals

The SFS or designee:

A. Reopens the exhibit in LIMS.

B. Adds the DEA-7 and original DEA-111 into LIMS Case Management, Case Attachments - Fingerprint Attachments, if original analysis was not done using LIMS.

C. Reroutes the exhibit to the fingerprint unit.

D. Sends the exhibit for examination.

E. Assigns the exhibit to a FS.

The FS:

A. Verifies the condition of the evidence seals (interior and exterior).

B. Compares the contents of the exhibit against the originally described evidence.

NOTE: The evidence may be reopened in the presence of a witness in order to inspect the contents.

C. Notifies laboratory management if contents of exhibit do not match the originally described evidence.

D. Records the observations on the DEA-466c or email.

E. Attaches the DEA-466c or email into LIMS Case Management, Case Attachments - Fingerprint Attachments.

F. Reseals the evidence.

G. Completes Evidence Disposition – LP Test.

3.0 Conducting Latent Print Examinations

3.1 Selecting Techniques and Procedures Used to Develop Latent Prints

The FS:

A. Uses validated techniques and procedures selected to minimize the destruction and increase the possible enhancement of latent prints.

B. Visually examines all specimens for latent prints, using ample lighting, before subjecting them to any fingerprint development technique.

3.2 General Requirements

The FS:

A. Conducts an examination on an exhibit and is responsible for correctly processing, preserving, describing, and reporting all comparable latent prints.

B. Documents a test print each time a reagent is used in casework and includes the results of the test print in LIMS Exhibit Analysis – Step Entries.

C. Uses LIMS tests to record all observations, examinations, and results at the time they are made.

D. Documents results so that they are identifiable to a specific task and in a manner that permits adequate reconstruction of the analysis or examination performed.

E. Completes comparisons of all unidentified latent prints, unless a deferred comparison has been documented. (See Appendix 2A)

3.3 Documenting Preserved Latent Prints

The FS:

A. Shows the location of the preserved latent prints on the specimen by placing an adhesive scale or non-adhesive scale next to the developed or observed latent print.

B. Adds the laboratory depiction identifier to the adhesive scale or depiction label.

C. Marks the depiction identifier (e.g., 1-1-1) assigned to a preserved latent print with the following:

    1. Exhibit Number
    2. Specimen Designation Number
    3. Latent Print Number

D. Uses a non-adhesive scale next to the developed or observed ridge detail in circumstances where there is insufficient space to place an adhesive scale next to the latent print.

E. Writes (at a minimum) the latent print number near the developed print or observed ridge detail.

F. Places a placard containing the LIMS Number, FSs initials, and date in the overall photograph documenting the location of the preserved latent print(s).

NOTE: A reviewer must be able to read the laboratory depiction identifier for each preserved latent print developed or observed in the overall photograph(s).

G. Attaches overall photographs in LIMS Case Management, Case Attachments - Fingerprint Attachments.

3.4 Unrecoverable Ridge Detail

When the latent print evidence on the specimen is:

1. Capable of being obliterated during subsequent processing;
2. Developed with a chemical known to fade over time; or
3. Susceptible to loss or destruction, then:

The FS:

A. Places non-rewriteable media or photographs of the latent print detail into the corresponding FIN or Non Drug Evidence (NDE) container.

B. Creates a sub-exhibit in LIMS and adds a No Analysis Performed Test.

C. Describes “Friction Ridge Unrecoverable” in Lab Exhibit Description Test.

D. Annotates in the remarks section of No Analysis Performed (at a minimum) “e.g., CD, DVD, and/or photographs only.”

E. Annotates in the remarks section of Evidence Disposition “e.g., CD, DVD, photographs, and/or new secondary container was added to container.”

F. Marks CD, DVD, and/or photographs with FS initials, date, and unique identifier.

G. Places CD, DVD, and/or photographs into a new secondary container.

H. Places secondary container inside original container.

3.5 Laboratory LIMS File Documentation

3.5.1 Latent Print Details Report

The FS:

A. Generates a LPDR from the information that has been entered into My Work Assignments and Pending Results Entry – LP Tests.

B. Begins the description of evidence with the number and detailed description of the physical evidence (e.g., one white envelope, four clear plastic zip lock type bags).

NOTE 1: Exhibits containing numerous quantities that are impractical to count can be generalized (e.g., multiple layers of plastic).

NOTE 2: Abbreviations are not used in the Description of Evidence test.

C. Annotates all blank spaces with "Not Applicable (N/A)."

EXCEPTIONS: Remarks, Comments, and Notes sections.

3.5.2 Latent Print Matrix Report

The FS:

A. Generates a DEA-466b from the information that has been entered into LIMS Results Entry My Assignments – LP Tests.

B. Documents all latent prints preserved.

C. Documents the following on the Latent Print Matrix Report:

1. Depiction ID
2. Impression Type
3. Processing Technique
4. Subject Comparison
5. Identification
6. Verification
7. AFIS

D. Annotates all blank spaces with "N/A."

EXCEPTIONS: Remarks, Comments, and Notes sections.

3.5.3 Latent Print Examination Report

The FS:

A. Generates a DEA-111 from the information that was entered in LIMS.

B. Removes Comparison Information section from the DEA-111 for the following processing examination results (See Appendix 2A):

1. No Friction Ridge Detail Developed or Observed
2. No Latent Prints Suitable for Comparison
3. Visual Examination Only
4. Not Suitable for Latent Print Examination
5. Contaminated Material

C. Does not use abbreviations in the Examination, Results, and Conclusions sections of the DEA-111.

EXCEPTION: When the submitted subject name on the DEA-7 or Non-Drug Evidence Laboratory Analysis Report (DEA-7b) is significantly different from the known print card used in a comparison, the abbreviation “aka” (also known as) can be used.

D. Does not list the name (e.g., right index finger) or the number (e.g., #2) of the finger in the DEA-111 when reporting an identification. Instead, delineates this information on DEA-466b.

E. Reports only the name as it appears on the known print card and federal Universal Control Number (UCN) or local numbering system when reporting an identification. Does not include titles, other numbers, or other descriptive information.

F. Uses SRL statements on the DEA-111. (See Appendix 2A)

G. Lists SRL statements on the DEA-111 in the following sequence, if applicable:

1. Processing Examination
2. Comparison Examination
3. AFIS Examination
4. DOJ ULTR Reference Statement

NOTE: Changes to the SRL regarding subject and verb agreement (i.e., singular to plural) are not deviations. (See Appendix 2A)

H. Obtains approval from SFS for any deviations of SRL and attaches into LIMS Case Management, Case Attachment – Fingerprint Attachments.

3.5.4 LIMS Documentation – Other Exhibit Documentation

The FS includes the following in the LIMS Case File, if available:

1. Hand-written notes that relate to the examination
2. Digital Imaging System photographs with documentation that relate to the analysis of the latent print detail, including complex latent print (CLP) documentation when applicable
3. Digital Workplace Printouts
4. Overall Photographs (JPG, XPS, and PDF files)
5. Fingerprint/Palm Print cards/Other Known Standard Cards (e.g., major case prints, joints of fingers, tips of fingers, etc.)
6. Deferred Examination Approval (Processing, Comparison, and AFIS Documentation).
7. AFIS Generated Documentation
8. DEA-466b (Completed outside of LIMS/e.g., Known to Known print card comparison)
9. Latent Print Case Activity & Communication Log DEA-466c
10. Latent Print Statistics Form DEA-466f
11. FBI/IAFIS/DHS Worksheet DEA-466d, if applicable

3.5.5 Latent Print Case Activity and Communication Documentation

The SFS and FS:

A. Document all activity and/or communication that occurred during the course of casework (e.g., contact with case agents or activity involving acquisition of fingerprint cards from state record bureaus).

B. Use emails, DEA-466c, and/or LIMS Communication Log Form to document activity and communication.

C. Attach emails and DEA-466c into LIMS Case Management, Case Attachments - Fingerprint Attachments.

3.5.6 Latent Print Statistics Form

The FS:

A. Documents exhibit statistics on the Latent Print Statistics Form (DEA-466f) for each exhibit with the following information:

1. Bench Transfers: Check the box if a bench transfer was conducted.
2. Total Specimens Examined: Number of individual specimens contained in the exhibit that were examined for latent prints.
   Example: 1 plastic container with lid: equals 2.
3. Total Suitable Latent Prints Developed: Number of latent prints suitable for identification that were developed.
4. Total Comparisons: Number of latent print comparisons to a known print card.
   Example 1: 1 latent print compared to 1 known finger print card: equals 10.
   Example 2: 1 latent palm print compared to 2 known palm print cards: equals 2.
5. Total Latent Prints Identified: Number of latent prints identified.
6. Total AFIS Searches: Number of AFIS/NGI/DHS searches that were conducted, including latent or ten print inquiries and latent re-inquiries.
7. Total AFIS Identifications: Number of latent prints or ten prints identified as the result of an actual AFIS/NGI/DHS search.

B. Attaches the DEA-466f into LIMS Case Management, Case Attachments – Fingerprint Attachments.

4.0 Friction Ridge Examination Methodology

4.1 Friction Ridge Examinations

The FS utilizes the process of Analysis, Comparison, Evaluation, and Verification (ACE-V) to all preserved friction ridge detail.

4.1.1 Analysis of Friction Ridge Detail

The FS:

A. Assesses latent print detail to determine suitability for comparison.

B. Considers the following factors in the assessment of latent print detail: quality (clarity) and quantity of first, second, and third level detail. (See Appendix 2B)

4.1.1.1 Documentation of Friction Ridge Detail Observed

The FS:

A. Documents analysis results and observations on all preserved latent prints.

B. Documents analysis results and observations within the description box of the digital imaging system.

C. Documents results and observations for each of the following:

1. First Level Detail
2. Second Level Detail
3. Third Level Detail
4. Complex Latent Print Factors

D. Documents a result of “Present/Not Present” for each examination followed by observation when “Present” is the result.

1. Example 1:

    a) Level 1 - Present – Whorl
    b) Level 2 - Present – Ridge Endings – Bifurcations
    c) Level 3 - Present – Ridge Structure – Flow
    d) Complex – Not Present

2. Example 2:

    a) Level 1 - Present – Loop
    b) Level 2 - Present – Ridge Endings – Bifurcations
    c) Level 3 - Present – Ridge Structure – Flow
    d) Complex – Present – Double Tap

4.1.2 Comparison of Friction Ridge Detail

A. Comparison is the direct or side-by-side observation of friction ridge detail to determine whether the detail in two impressions are in agreement, based upon similarity, sequence, and spatial relationship.

B. No absolute number of characteristics is required to establish a source identification.

The FS:

C. Determines if one or more CLP factors are found to be challenging to the comparison.

D. Attaches any additional CLP documentation (e.g., charts, written notes, notations) into LIMS Case Management, Case Attachments, Fingerprint Attachments.

E. Enters “Additional CLP Documentation” in the description box.

4.1.3 Evaluation of Friction Ridge Detail

The FS:

A. Evaluates friction ridge detail based upon analysis and comparison of friction ridge impressions.

B. Reaches only one of the following conclusions for each comparison: (See Appendix 2D for definitions)

1. Source Identification (i.e., came from the same source)
2. Inconclusive
3. Source Exclusion (i.e., came from a different source)

4.1.3.1 Evaluation Documentation

The FS:

A. Documents the results of the comparison and evaluation of the latent print detail preserved on the DEA-466b, including:

1. Source Identification
2. Source Exclusion
3. Inconclusive
4. Not compared
5. Not suitable for identification
6. Exemplar(s) used to reach the conclusions
7. Identified specific anatomic source (e.g., #1 or RT=Right Thumb, RP=Right Palm)
8. FS initials and date of each identification

B. Documents conclusions prior to verification.

4.1.4 Verification

The International Association for Identification (IAI) certified FS:

A. Performs an independent verification on all identifications, using the ACE process, to either support or refute the conclusions of the original FS.

B. Enters their username and password to document the verification in LIMS Exhibit Analysis Test/Depictions and LP Matrix/Verify.

C. Confirms that their name and date appears in LIMS Depictions and LP Matrix – LP Test within the Verification By (Date) to indicate the verification has been completed.

D. Resolves differences in technical opinions through the Conflict Resolution process. (See 2-7.4)

5.0 Digital Imaging

5.1 Digital Image Capture

The FS:

A. Uses a Digital Imaging Capture device to preserve the image once a latent print has been developed and is determined to be suitable for comparison.

NOTE: The entire friction ridge detail in the image must be captured in at least one complete unedited depiction.

B. Places an adhesive scale on the evidence next to the preserved latent print or includes a scale with the captured image containing either the laboratory depiction designation or a depiction label. (See 2-4.3)

C. Captures a digital image at a minimum of 1000 pixels per inch when possible.

5.2 Digital Imaging Processing

The FS:

A. Acquires the captured digital image from the capture device using the Image Management System.

B. Enters LIMS Case Number, Crime Type, and Description, as required by the Image Management System.

C. Enters the following in the Description field:

1. Latent Print Depiction Identifier
2. Description of the Specimen
3. Documentation of First Level Detail, Second Level Detail, Third Level Detail, and Complex Latent Print Factor(s) (See 2-4.1.1.1)

D. Verifies that the original image was saved in the database.

E. Completes the enhancements of the images using the approved image editing software accessed through the Image Management System.

NOTE: The FS has the discretion to determine whether to enhance an image.

5.3 Archiving and Backing Up Images

A. The SFS assigns a FS at each of the laboratories to verify the system back-up.

B. The FS refers to the Digital Imaging System's user manual for specific instructions for archiving and system back-ups.

5.3.1 System Back-up

The assigned FS:

A. Logs (electronic or written) the results performed on each work day.

B. Performs annual archiving by the end of the fiscal year.

C. Purges the Digital Imaging System of images older than two years from date of archive (e.g., if an archive is performed on September 1, 2017, then all images from September 1, 2015 and prior will be archived).

D. Writes images to a non-rewritable optical media, either DVD or DVD/Record (DVD-R) or Compact Disc/Record (CD-R).

E. Archives images to two non-rewritable optical media.

F. Chooses “read only” option to prevent any alterations to the non-rewritable optical media when archiving.

G. Verifies that the images were successfully written to each non-rewritable optical media before deleting the images from the digital imaging server.

H. Stores the non-rewritable optical media in two separate secured locations, one of which is readily accessible to the FSs.

6.0 Conducting Automated Fingerprint Identification System Searches

6.1 Requirements

The FS

A. Conducts an AFIS evaluation and search on any latent print(s) that remains unidentified in the exhibit.

EXCEPTION 1: When the unidentified latent print is found not suitable for an AFIS search.

EXCEPTION 2: When the unidentified latent print was developed on evidence seized from a location believed to be outside of the United States (e.g., off-shore boat or aircraft).

EXCEPTION 3: When a subject in the exhibit has already been identified and deferred AFIS approval was obtained.

B. Follows Department of Homeland Security AFIS guidelines. (See Appendix 2C)

6.2 Universal Latent Workstation

The FS:

A. Uses the Federal Bureau of Investigation (FBI) Universal Latent Workstation (ULW) software to search and compare unidentified latent prints.

B. Searches latent prints as Latent Friction Feature Search (LFFS) and/or Latent Friction Image Search (LFIS).

    1. Enters the Case Prefix and Case ID for each latent print searched.
    2. Case Prefix: FS Initials, Laboratory Depiction Number (e.g., BCL_1-1-1-A)
    3. Case ID: LIMS Case Number (e.g., 2016-SFLX-XXXXX)

C. Is not required to register an unidentified latent print in the ULW.

6.3 Regional Automated Fingerprint Identification System

The FS may use the regional AFIS database for searching unidentified latent prints.

6.4 Department of Homeland Security Automated Fingerprint Identification System

The FS:

A. May use the DHS database for searching unidentified latent prints.

B. Follows the requested procedures when submitting an AFIS search request to DHS. (See Appendix 2C)

C. Requests a candidate list and/or subject's known fingerprints with the accompanying biographic data from DHS, when necessary.

NOTE: Privacy requirements may restrict the dissemination of the candidate list in some instances.

D. Attaches the electronic mail message sent to DHS into LIMS Case Management, Case Attachments - Fingerprint Attachments.

E. Attaches the report from DHS into LIMS Case Management, Case Attachments - Fingerprint Attachments.

6.5 Additional Reporting and Documentation Requirements

The FS:

A. Documents AFIS submissions in the LIMS Result Entry – Depictions tab.

B. Does not report negative search results of candidates produced via a search.

C. Attaches all AFIS-generated documentation into LIMS Case Management, Case Attachments - Fingerprint Attachments including:

1. List of candidates generated for each search.
2. Printout of encoded image for local AFIS search.
3. Print for Records Report (LFFS and/or LFIS)

D. Verifies above documentation is saved in LIMS prior to removing it from the workstation.

7.0 Conducting Reviews

7.1 Requirements

A. Technical and administrative reviews will be performed on all casework.

B. Technical reviews are performed by a FS or SFS.

C. Administrative reviews are performed by SFS or designee.

D. Resolves differences in technical opinions through the Conflict Resolution process. (See 2-7.4)

7.2 Technical Reviews

A. The technical reviewer verifies:

1. Conclusions and supporting case documentation are present and complete.
2. Conclusions are consistent with the documented data and are within the limitations of the discipline.
3. All supporting documentation is included in the case file.
4. Unique identifier and exhibit are properly documented on all reports.
5. Evidence description is complete and consistent with the DEA-7 or DEA-7b.
6. Observations and analyses are clearly and completely documented, in accordance with policy.
7. Appropriate examinations have been performed.
8. Identifications have been verified and documented.
9. Reports and results are clear, concise, accurate, and complete.

B. The name of the technical reviewer and date of the review will be documented in LIMS.

NOTE 1: The technical reviewer's name and date reviewed appear on the LPDR – Review Information.

NOTE 2: The technical reviewer is not responsible for conducting a physical examination of the evidence.

7.3 Administrative Reviews

The administrative reviewer verifies:

A. Compliance with procedures for documenting latent print examinations.

B. Necessary technical review has been conducted and documented.

C. Documentation is free of administrative or transfer errors and the improper use of abbreviations.

NOTE 1: The administrative reviewer's name and date reviewed appear on the LPDR – Review Information.

NOTE 2: The administrative reviewer's name and date reviewed appear on the DEA-111.

7.4 Conflict Resolution

Conflict resolution is the process used to settle differences in technical opinion between the examiner and reviewer.

NOTE: The conflict resolution process may include reviewing examination notes and discussing and potentially re-examining the evidence.

A. The process resolves differences in technical opinion through the following incremental steps:

    1. Discussion between examiner and reviewer
    2. Independent review
    3. Consensus panel

B. FSs document the basis for their opinions at steps 2 and 3 in the process. The FS:

    1. Includes memoranda explaining the basis of opinions.
    2. Includes supporting documentation (e.g., charts, photos, etc.).
    3. Attaches notations, images, and documentation generated during the conflict resolution process into the case file.

7.4.1 Discussion between Examiner and Reviewer

A. The examiner and reviewer discuss their respective opinions and review case documentation and any relevant materials.

B. The examiner and reviewer either resolve their differences in opinion or notify the SFS if resolution cannot be reached.

NOTE: No approval or additional documentation is required if the issue is resolved between examiner and reviewer.

C. The FSs submit all notations, images, and documentation generated during the discussion to the SFS when resolution cannot be reached.

NOTE: The LQAM is notified when the SFS is the original or reviewing fingerprint specialist.

7.4.2 Independent Review

An independent review is conducted after the examiner and reviewer fail to resolve their differences in opinion.

The SFS:

A. Appoints an IAI certified FS from a different laboratory to perform an independent review.

B. Provides unannotated images/photographs and any relevant documentation to the independent reviewer.

C. Provides guidance on refraining from any technical discussion of the examination or their conclusions with others.

D. Does not provide IA Case Number, LIMS #, Exhibit #, or identity of the Original / Reviewing FS to the independent reviewer.

NOTE: The LQAM performs the duties of the SFS when the SFS is the original or reviewing fingerprint specialist.

The Independent Reviewer:

E. Conducts a blind and independent examination using the provided unannotated images/photographs and any relevant documentation.

F. Reports their conclusions to the SFS.

G. Submits notations, images, and documentation generated during their review to the SFS.

The SFS:

H. Notifies the examiner and reviewing FSs of the independent reviewer conclusion and discusses the findings with both FSs to try to resolve the conflict.

I. Protects the identity of the independent reviewer.

J. Documents the resolution of the disagreement in LIMS Case Management – Fingerprint Attachments.

K. Notifies the LQAM and SF Program Manager (PM), if consensus cannot be reached.

7.4.3 Consensus Panel

A consensus panel is convened after an independent review fails to resolve differences in technical opinion.

The SFS:

A. Requests SF PM to convene a consensus panel.

B. Provides IA Case Number, LIMS #, Exhibit #, and Original and Reviewing FS names to the LQAM and SF PM.

C. Provides unannotated images/photographs and any relevant documentation to SF PM.

D. Provides name of Independent Reviewer to SF PM.

The SF PM:

E. Convenes a consensus panel consisting of three IAI certified FSs.

F. Selects consensus panel participants (CPPs) from three laboratories with a fingerprint program.

G. Avoids selecting a CPP from the originating laboratory.

H. Provides unannotated images/photographs and any relevant documentation.

I. Does not provide IA Case Number, LIMS #, Exhibit #, and identities of the Original / Reviewing / Independent Reviewer FS.

The CPPs:

J. Conduct a blind, independent examination.

K. Convene after the independent examinations to discuss findings.

L. Issue a consensus conclusion statement(s) to the SF PM.

The SF PM:

M. Provides a summary of the consensus panel conclusion(s) to the SFS, LQAM, and SFQAM.

The SFS:

N. Informs Original / Reviewing FSs of the consensus panel conclusion.

O. Ensures a final report, consistent with the consensus panel conclusion(s), is issued by the original FS, reviewing FS, or SFS.

The SFQAM:

P. Reviews the conflict resolution documentation and determines if additional action is necessary (e.g., preventative action or policy change).

7.4.4 Reporting Conclusion(s)

A. Reported conclusion(s) support the conclusion(s) reached as a result of the consensus panel.

B. Uses SRL in the Examination, Results, and Conclusions section of the DEA-111. (See Appendix 2A)

The original FS:

C. Issues the report when consensus panel conclusion(s) supports the original examination.

The reviewing FS:

D. Issues the report when consensus panel conclusion(s) supports the conclusion(s) of the reviewing FS.

The SFS:

E. Issues an inconclusive report when the consensus panel cannot reach agreement.

NOTE: The individual issuing the reported conclusion(s) must support the conclusion(s) reached as a result of the consensus panel.

8.0 Preliminary Results

The FS:

A. Is authorized to provide preliminary negative results prior to a final report.

B. Reports one of the following preliminary negative results:

    1. No latent prints developed.
    2. No latent prints suitable for identification.
    3. Exclusions effected to date.

C. Will not offer preliminary positive results until after a verification of identification or a technical review has been conducted.

D. Conveys that a comprehensive review has not yet been completed and the final results may be subject to change.

E. Documents communication of preliminary positive or negative results by LIMS-Activity and Communication Log, DEA-466/DEA-466c, or email.

F. Attaches documentation into LIMS Case Management, Case Attachments - Fingerprint Attachments.

CHAPTER 3 – FIELD ASSISTANCE

1.0 Field Assistance

1.1 Scope

A. Forensic support for field assistance can range from support of clandestine laboratory investigations to the processing of bulk evidence in the field.

B. Laboratory personnel use the procedures described in this chapter, in conjunction with REDACTED.

2.0 Latent Print Field Processing

The LD or designee:

A. Coordinates field processing response within the laboratory's area of responsibility in which DEA asserts primary authority.

B. Ensures that only clandestine laboratory certified FSs respond to field investigations.

C. Ensures that all clandestine laboratory certified FSs have a working knowledge of the evidence procedures in REDACTED.

D. Ensures that all participating FSs have a working knowledge of latent print processing used in the field.

The SFS:

E. Assigns the exhibit(s) seized during a field investigation to the FS(s) who participated in the operation, when practical.

2.1 Preparing for Field Processing

The FS:

A. Communicates, plans, and organizes with the SA, DI, or TFO on technical and logistical matters pertinent to the investigation.

B. Responds to requests for field assistance with proper personal protective equipment (PPE) (e.g., respirators, goggles, etc.).

C. Ensures that all participating laboratory personnel are familiar with all the information supplied to the field laboratory by the SA, DI, or TFO regarding the investigation.

D. Determines:

1. What type and amount of evidence to be processed.
2. Number of FSs needed for processing of scene.
3. Equipment needed for latent print processing.
4. Chemicals and material required for latent print processing.

2.2 On Site Activities

The FS:

A. Enters the laboratory only after the premises are secured by the SAs, DIs, or TFOs.

B. Conducts an assessment of the site to identify potential hazards and conditions that might affect latent print processing.

C. Obtains approval from the SA, DI, or TFO prior to moving items that require relocation for safety reasons and for latent print processing.

D. Assists the SAs, DIs, or TFOs in preparing a complete inventory of the site and in determining what evidence can be processed for latent prints.

E. Assists the SAs, DIs or TFOs in the handling and preparation of fingerprint evidence for submission to the laboratory.

F. Creates a DEA-12 (Receipt for Cash or Other Items) for transfer of developed latent print evidence to the SA, DI, or TFO.

G. Coordinates with FCs to determine best protocol for latent print processing before a chemical sampling.

H. Photographs all essential areas of the site, as well as the evidence selected for latent print processing.

I. Documents fingerprint evidence with generic identifier, initials, and case identifier (IA Case #).

J. Ensures recognition of fingerprint evidence in photographs.

K. Determines the correct processes in developing latent prints.

L. Documents deviations of processing of specimens on the DEA-466.

NOTE: Discusses deviations with the SFS beforehand, if possible.

M. Records any maintenance conducted on fingerprint equipment in the maintenance logbook.

2.3 Upon Return to Laboratory

The FS:

A. Restocks supplies and cleans fingerprint and reusable PPE equipment.

B. Transfers all digital images from the camera memory card to the digital imaging system under the IA Case Number.

NOTE: Document on the DEA-466 the transfer of digital images from the camera memory card to the digital imaging system (i.e. Images transferred to digital imaging system, IA Case #, Date, and FS Initials).

2.4 Field Processing Documentation

The FS:

A. Prepares a DEA-466 (DEA-466a, when applicable), the report will contain the following:

1. IA Case Number
2. Description of Evidence
3. Latent Print Development Processing

4. Documentation of Evidence Transfer (if needed)
5. Documentation of transfer of digital images from the camera memory card to the digital imaging system (if applicable).

B. Retains all original documentation in the case file, including (but not limited to):

1. Handwritten notes
2. Sketches or diagrams
3. DEA-466c (if applicable)
4. DEA-12 (if applicable)

C. Attaches all documentation into LIMS Case Management, Case Attachments - Fingerprint Attachments when fingerprint evidence is received into the laboratory.

2.5 Reporting

The FS:

A. Prepares a DEA-111 after the field investigation has been completed.

B. Uses SRL for Field Investigation Results. (See Appendix 2A)

C. Saves a copy of the DEA-111 in the hard copy case file.

D. Attaches the DEA-111 into LIMS Case Management, Case Attachments - Fingerprint Attachments when fingerprint evidence is received into the laboratory.

E. Generates a supplemental DEA-111 when fingerprint evidence is received into the laboratory to report the subsequent examination conclusions.

CHAPTER 4 – ORIENTATION AND TRAINING

1.0 Orientation and Training

1.1 Scope

A. This chapter applies to all newly-hired and rehired FSs.

B. FSs must successfully complete required content and pass a competency comparison examination before examining casework.

2.0 Responsibilities

The LD:

A. Determines competency. (See LOM 72)

B. Designates the Training Fingerprint Specialist (TFS).

The SFS:

C. Assigns duties to the TFS.

D. Creates the practical skills assessments and training exercises, in accordance with policy.

E. Communicates with all affected LQAMs and LDs regarding performance.

F. Recommends remedial training and counseling during the probationary period.

G. Reviews the training program to identify gaps in instruction, materials, and propose changes to improve program delivery.

H. Maintains training records.

I. Assigns the competency and comparison examination.

J. Provides appropriate training and competency documentation to the LQAM.

K. Provides necessary outside training.

The TFS:

L. Administers training exercises and practical skills assessments.

M. Provides additional training, as needed.

N. Provides written weekly progress updates to the SFS.

O. Meets with the SFS to discuss overall progress on a bi-weekly basis.

P. Documents the completion of tasks.

The FS:

Q. Completes required training exercises.

R. Completes external training or additional training exercises as necessary.

S. Completes a competency comparison examination.

3.0 Training Content

3.1 Required Content

Training exercises in the following subject areas will be completed by the FS to demonstrate competency:

1. Established Policies, Procedures, and Guidelines
2. Evidence Handling
3. Methods
4. Equipment
5. Latent Print Comparison
6. Forms, Reports, and Documentation
7. AFIS
8. Procedures of Law, Law, and Regulations
9. Moot Court

NOTE: The SFS will determine training exercise requirements for a rehired FS.

3.2 External Training

The FS will receive external training as determined by the SFS.

3.3 Clandestine Laboratory Training

The FS will receive clandestine laboratory training before participating in field work. (See Chapter 3-2.0)

3.4 Competency Examination

The FS will successfully complete a competency comparison examination administered by the SFS.

3.5 Additional Training

Additional training may be provided by the TFS until the FS demonstrates competency.

NOTE: In some cases, training may require FS to successfully complete additional competency examinations.

APPENDIX 1A – LPEM DEFINITIONS

Term	LPEM Definition	Reference
Accreditation Cycle	The period of time (generally four years) between the date that accreditation is granted and the date accreditation expires.	3
AFIS	Acronym for Automated Fingerprint Identification System. A generic term for a fingerprint matching, storage, and retrieval system.	2
ACE-V	Acronym for a scientific method: Analysis, Comparison, Evaluation, and Verification (see individual terms).	1
Analysis	The first step of the ACE-V method. The assessment of an impression to determine suitability for comparison.	1
Candidate List	Compiled ranking of images generated from an NGI search. Rankings are arranged from highest to lowest score based on the information entered.	5
Capture Device	A device, such as a digital camera, flatbed scanner, or film scanner, used to record a digital image of an object.	5
Case Number	Contains the office designators and the case number. See IA	5
CD-R	Acronym for Compact Disc-Recordable. Optical disc format designed to function as data storage media.	5
Characteristic	Feature of friction ridges. Commonly referred to as a minutiae, Galton detail, point, feature, ridge formation, or ridge morphology.	5
Comparison	The second step of the ACE-V method. The observation of two or more impressions to determine the existence of discrepancies, dissimilarities, or similarities.	1
Competency	Possessing and demonstrating the requisite knowledge, skills, and abilities to successfully perform a specific task.	1
Complex Analysis	The advanced examination of friction ridge skin due to dissimilarities or factors influencing the quality of the latent print that could interfere with the proper interpretation of the print.	5
Complex Latent Print	Latent prints are considered complex when one or more factors are observed which affect the quality or quantity of ridge detail.	4
Cyanoacrylate Ester (CAE)	An adhesive used in a fuming method to develop latent prints.	5
Depiction/Original Image	An accurate replica (pixel for pixel) of the primary image.	1
Digital Capture	The process of recording an image of an object onto any digital media.	5
Digital Image	A numerical representation recorded as a series of binary digits (bits) either as 1 or 0 with no values in between. See Depiction.	5
Digital Media	Any object on which a digital image is preserved.	5

Term	LPEM Definition	Reference
Depiction	See Latent Print.	4
Distortion	Variances in the reproduction of friction skin caused by factors such as pressure, movement, force, and contact surface.	1
DVD-R	Acronym for Digital Versatile Disc or Digital Video Disc/Record. Optical disc format designed to function as data storage media.	5
Evaluation	The third step of the ACE-V method wherein an examiner assesses the value of the details observed during the analysis and the comparison steps and reaches a conclusion.	1
Evidence	Equivalent to test items material, regardless of form, which is received by a laboratory for the purpose of gleaning information relevant to a criminal investigation through examination/analysis by one or more of the laboratory's testing procedures.	3
Exclusion	The determination by an examiner that there is sufficient quality and quantity of detail in disagreement to conclude that two areas of friction ridge impressions did not originate from the same source.	1
Examination	The procedure utilized by the laboratory fingerprint specialist to obtain information from evidence in order to reach conclusions concerning the nature of and/or associations related to evidence received by the laboratory.	3
External Proficiency Test	A test prepared, provided by, and reported to a source external to the laboratory, laboratory system, or the laboratory parent organization.	3
Fingerprint	An impression of the friction ridges of all or any part of the finger.	1
Friction Ridge	A raised portion of the epidermis on the palmar or plantar skin, consisting of one or more connected ridge units.	1
Friction Ridge Detail (Morphology)	An area comprised of the combination of ridge flow, ridge characteristics, and ridge structure.	1
FUR	Acronym for friction ridge unrecoverable. Friction ridge detail not able to be retained on the evidence on which it was developed on; is considered the "best evidence" in the exhibit.	4
IA	Acronym for Investigating Agency. See Case Number.	5
IAFIS	Acronym for Integrated Automated Fingerprint Identification System.	5
Identification	The determination by an examiner that there is sufficient quality and quantity of detail in agreement to conclude that two friction ridge impressions originated from the same source.	1

Term	LPEM Definition	Reference
Known Prints	The prints of an individual, associated with a known or claimed identity, and deliberately recorded electronically, by ink, or by another medium. (Finger, Palm, and Foot Prints)	1
Known to Known Comparison	Comparison of a known print (either ten print or single print) with another known print.	5
LASER	Acronym for Light Amplification by Stimulated Emission of Radiation. The device produces coherent wavelengths of light.	5
Latent Print	Transferred impression of friction ridge detail not readily visible. Generic term used for unintentionally deposited friction ridge detail.	1
Level One Detail	Friction ridge flow, pattern type, and general morphological information.	1
Level Two Detail	Individual friction ridge paths and associated events, including minutiae.	1
Level Three Detail	Friction ridge dimensional attributes, such as: width, edge shapes, pores, and the shapes of the ridge structures.	1
Lift	An adhesive or other medium used to transfer a friction ridge impression from a substrate.	1
LIMS	Acronym for Laboratory Information Management System. A computerized case tracking system.	8
Matrix	The substance that is deposited or removed by the friction ridge skin when making an impression.	1
Minutiae	Events along a ridge path, including bifurcations, ending ridges, and dots (also known as Galton details or characteristics).	1
NGI	Acronym for Next Generation Identification. The updated version of IAFIS	1
Not Identifiable	The determination by the examiner when the print is unsuitable for comparison due to the lack of sufficient detail.	0
Quality	The clarity of the information contained within a friction ridge impression.	1
Quantity	The amount of information contained within a friction ridge impression.	1
Quality Assurance	Those planned and systematic actions necessary to provide sufficient confidence that a laboratory's product or service will satisfy given requirements for quality.	3
Palm Print	An impression of the friction ridges of all or any part of the palmar surface of the hand.	1
Proficiency	The ongoing demonstration of competency.	1

Term	LPEM Definition	Reference
Proficiency Test	A test to evaluate the capability and performance of fingerprint specialist, technical support personnel, and the laboratory; in open tests, the analysts and technical support personnel are aware that they are being tested; in blind tests, they are not aware.	3
Proper Seal	A seal that prevents loss, cross transfer, or contamination while ensuring that attempted entry into the container is detectable. A proper seal may include a heat seal, tape seal, or a lock. The initials or other identification of the person creating the seal will be placed on the seal or across the seal onto the container when possible.	3
RAW	Image file that contains the unprocessed data from the image sensor of a digital camera.	5
Reagent	Substance used in a chemical reaction to detect, examine, measure, or produce other substances.	5
Ridge Flow	The direction of one or more friction ridges. A component of Level 1 detail.	1
Ridge Path	The course of single friction ridge. A component of Level 2 detail.	1
Secondary Container	As any container being used beyond the original manufacturer's bottle that the chemical was shipped in. This may include, but is not limited to: Portable or working containers, such as flasks, beakers, or small storage bottles in “immediate use”.	9
TIF / TIFF	The acronym Tagged Image File Format.	5
Tonal Reversal	A transferred impression representing the furrows of a friction ridge impression rather than the ridges. Tonal reversals result in the reverse effect than expected (i.e. with ink or black powder, the dark lines represent the furrows instead of the friction ridges).	6
Verification	Independent application of the ACE process as utilized by a subsequent examiner to either support or refute the conclusions of the original examiner.	1
UCN	Acronym for Universal Control Number. A unique number within the Criminal Justice Information Services (CJIS) Division files assigned to an individual.	7
Working Solution	Solution at the proper dilution for processing.	5

Reference #	Reference Location
1	NIJ The Fingerprint Sourcebook
2	SWGFAST Standard Terminology of Friction Ridge Examination
3	2011 Supplemental Requirements for Accreditation of Forensic Science Testing Laboratories – Appendix A - Glossary
4	Latent Print Examination Manual
5	FBI Latent Print Operations Manual Integrated Automated Fingerprint Identification System, Glossary 2008 Examining Friction Ridge Impressions, Glossary 2010 Processing Used to Develop Latent Prints, Glossary 2006 Digital Images, Glossary 2008 Definitions and Abbreviations, 2017
6	Michele Triplett Fingerprint Terms/www.fprints.nwlean.net/d.htm
7	FBI Universal Latent Workstation Version 6.4.1 Supplemental Instructions
8	LIMS LP Quick Reference Guide (QRG) Version 1.6
9	www.marquette.edu.orc.documents

APPENDIX 1B – SYMBOLS, ACRONYMS, AND ABBREVIATIONS

Symbols and Abbreviations	Definitions
⃠	Identified Latent Print (Symbol)
/	Symbol for Left Slant Loop
\	Symbol for Right Slant Loop
A	Arch
AB	Amido Black
ACE-V	Analysis, Comparison, Evaluation, and Verification Methodology
ADAMS	Authenticated Digital Asset Management System
ADM	Analysis of Drug Manual
ADX	Ardrox
AFIS	Automated Fingerprint Identification System
AFIX	AFIX Tracker System
AKA	Also Known As
ALS	Alternate Light Source
ALT BP	Alternate Black powder
REDACTED	REDACTED
AQ	AFIS Quality
ASP	Adhesive Side Powder
BET	Black Electrical Tape
BMP	Black Magnetic Powder
BP	Black Powder
BT	Black Tape
BW	Bubble Wrap
C	Compared, No ID (DEA-466b only)

Symbols and Abbreviations	Definitions
CAE	Cyanoacrylate Ester (chamber/glue fuming)
CAL	Caliber (weapon)
CAL-DOJ	California – Department of Justice
CBB	Coomassie Brilliant Blue R250
CDO	Crowle's Double Stain
CD-R	Compact Disc/Recordable
CJIS	(FBI) Criminal Justice Information Services
CLP	Complex Latent Print
CP	Clear Plastic
CPA	Convenience Packaging
CPB	Clear Plastic Bag
CPLSB	Clear Plastic Lock Seal Bag
CPP	Consensus Panel Participants
CPSB	Clear Plastic Sandwich Bag
CPW	Clear Plastic Wrap
CRT	Clear Reinforced Tape
CT	Clear Tape
CYVAC	Cyanoacrylate Vacuum Chamber
DEA	Drug Enforcement Administration
DEA-111	Latent Print Examination Report
DEA-12	Receipt For Cash or Other Items
DEA-466	Latent Print Examination Worksheet
DEA-466a	DEA-466 Continuation Sheet
DEA-466b	Latent Print Matrix Report
DEA-466c	Latent Print Case Activity & Communication Log

Symbols and Abbreviations	Definitions
DEA-466f	Latent Print Statistics Form
DEA-7	Report of Drug Property Collected, Purchased, or Seized
DEA-7a	Acquisition of Non-Drug Property Seizures
DEA-7b	Non-Drug Evidence Laboratory Analysis Report
DFO	1,8-diazafluoren-9-one
DHS	Department of Homeland Security
DI	Diversion Investigator
DOJ	Department of Justice
DVD	Digital Versatile Disc or Digital Video Disc
DVD-R	Digital Versatile Disc or Digital Video Disc-Record
E.G.	For Example
ENV	Environmental Humidity Chamber
EPTP	External Proficiency Testing Program
ES	Evidence Specialist
EX	Exhibit
EXT	External
F	Fingerprint (DEA-466b only)
FBI	Federal Bureau of Investigation
FBS	Firebird Booking Station
FC	Forensic Chemist
FIN	Fingerprint Unit
FLP	Fluorescent Powder
FLS	Forensic Light Source
FP	Fingerprint
FR	Fragment (DEA-466b only)

Symbols and Abbreviations	Definitions
FS	Fingerprint Specialist
FSIS	Full Spectrum Imaging System
FUR	Friction Ridge Unrecoverable
GB	Glassine Bag
GE	Glassine Envelope
GP	Gray Powder
GS	Group Supervisor
GV	Gentian Violet
HSEE	Heat Seal Evidence Envelope
I	Impression
I.E.	That Is
IA	Investigative Agency
IAFIS	Integrated Automated Fingerprint Identification System (FBI)
IAI	International Association for Identification
ID	Identification
IF	Inherent Fluorescence
INT	Internal
IRR	Image Request Response
J	Lower Joint (DEA-466b only)
JABS	Joint Automated Booking Service
.jpg	Joint Photographic Experts Group
L	Loop
LASER	Light Amplification by Stimulated Emission of Radiation
LD	Laboratory Director
LF	Left Footprint (DEA-466b only)

Symbols and Abbreviations	Definitions
LFFS	Latent Fingerprint Feature Search
LFIS	Latent Fingerprint Image Search
LI/7	Left Index Finger (#7) (DEA-466b only)
LIMS	Laboratory Information Management System
LL/10	Left Little Finger (#10) (DEA-466b only)
LM/8	Left Middle Finger (#8) (DEA-466b only)
LOM	Laboratory Operations Manual
LP	Latent Print
LPP/L	Left Palm Print (L) (DEA-466b only)
LPDR	Latent Print Details Report (Generated by LIMS)
LPEM	Latent Print Examination Manual
LPER	Latent Print Examination Report (Generated by LIMS)
LQAM	Laboratory Quality Assurance Manual
LR/9	Left Ring Finger (#9) (DEA-466b only)
LSB	Lock Seal Bag
LT/6	Left Thumb (#6) (DEA-466b only)
M	Major Case (DEA-466b only)
MBD	7-P-methoxybenzlamino- 4notrobenz-2-oxa-1,3-diazile
MCP	Major Case Prints
MGP	Magnetic powder
MSDPS	Maryland State Department of Public Safety
MT	Masking Tape
N	Not Compared (DEA-466b only)
N/A	Not Applicable
NAQ	Not AFIS Quality

Symbols and Abbreviations	Definitions
NARD	No Additional Ridge Detail
NE	Not Evaluated (DEA-466b only)
NEG	Negative
NGI	(FBI) Next Generation Identification
NI	Not Identifiable
NIN	Ninhydrin
NLP	No Latent Prints
NV	No Value
NVRD	No Visible Ridge Detail
NYDPS	New York Department of Public Safety
O	Compared, No ID, Need Additional Known Prints (DEA-466b only)
OPR	Office of Professional Responsibility
ORG	Original
OV	Of Value
P	Palm print (DEA-466b only)
PAB	Paper Bag
PB	Plastic Bag
PD	Physical Developer
.pdf	Portable Document Format
PH	Photograph(s)
PKG	Package
PM	SF Fingerprint Program Manager
POS	Positive
PP	Palm Print
PPE	Personal Protective Equipment

Symbols and Abbreviations	Definitions
PPI	Pixels Per Inch
PSEE	Plastic Sealed Evidence Envelope [Heat Sealed Evidence Envelope (HSEE) or Self Sealing Evidence Envelope (SSEE)]
PTP	Proficiency Testing Program
PW	Plastic Wrap
QA	Quality Assurance
QAM	Quality Assurance Manager
QAS	Quality Assurance Specialist
QRG	Quick Reference Guide
R6G	Rhodamine 6G
RAM	Rhodamine 6G, Ardrox, MBD dye stain
RF	Right Footprint (DEA-466b only)
RI/2	Right Index Finger (#2) (DEA-466b only)
RL/5	Right Little Finger (#5) (DEA-466b only)
RM/3	Right Middle Finger (#3) (DEA-466b only)
RR/4	Right Ring Finger (#4) (DEA-466b only)
RPP/R	Right Palm Print (R) (DEA-466b only)
RSLD	Resealed
RT/1	Right Thumb (#1) (DEA-466b only)
RTV	Returned to Vault
RUVIS	Reflective Ultraviolet Imaging System
SA	Special Agent
SABIS	Statewide Automated Biometrics Identification System (New York)
SAC	Special Agent in Charge
SBX	Sealed Box
SC	Supervisory Chemist

Symbols and Abbreviations	Definitions
SF	Office of Forensic Sciences
SFC	Senior Forensic Chemist
SFDCC	Office of Forensic Sciences Document Control Center
SFM	Laboratory Management & Operations
SFPS	Senior Fingerprint Specialist
SFQ	Quality Assurance Section
SFS	Supervisory Fingerprint Specialist
SID	State Identification Number
SN	Silver Nitrate
SRL	Standard Reporting Language
SSEE	Self-Sealing Evidence Envelope
SSET	Safety Seal Evidence Tape
SSP	Sticky Side Powder
ST	Scotch Tape
SWGFAST	Scientific Working Group on Friction Ridge Analysis, Study and Technology
T	Tip of Finger (DEA-466b only)
TD	Titanium Dioxide (Ti02)
TFO	Task Force Officer
TFS	Training Fingerprint Specialist
TIF / TIFF	Tagged Image Format File
TOT	Turned over To
TP	Toe Print (DEA-466b only)
TR	Technical Reviewer
TXDPS	Texas Department of Public Safety
UCN	Universal Control Number

Symbols and Abbreviations	Definitions
UF	Unknown Footprint (DEA-466b only)
ULF	Unsolved Latent File
ULM	Universal Latent Match
ULW	Universal Latent Workstation
UV	Ultra-Violet Light
VIN	Vehicle Identification Number
VIS	Visual
VSB	Vacuum Seal Bag
W	Whorl
WIN	Western Identification Network
X	Not Identifiable (DEA-466b only)
.xps	Open XML Paper Specification
ZLPB	Zip Lock Plastic Bag

APPENDIX 2A – STANDARD REPORTING LANGUAGE

Processing Examination Results

No Friction Ridge Detail Developed or Observed

Criteria: No friction ridge detail was developed or observed on all specimens within the exhibit.

SRL: **No latent prints were developed or observed.**

Example: No latent prints were developed

No Latent Prints Suitable for Comparison

Criteria: The exhibit contains specimens that have latent print detail developed or observed that contain no latent prints suitable for comparison. In addition, the exhibit may also contain specimens that have no latent print detail developed or observed.

SRL: **No latent prints suitable for comparison were developed or observed.**

Example: No latent prints suitable for comparison were developed.

Latent Prints Suitable for Comparison

Criteria: Latent prints suitable for comparison were developed or observed on the specimens that were examined.

SRL: **_____ suitable for comparison was (developed or observed) on (# and indicate specific specimen(s)).**

Example: Latent prints suitable for comparison were developed on one clear plastic baggie.

Remaining Specimens – Additional Reporting Statement

Criteria: Latent prints suitable for comparison were not (developed or observed) on the remaining specimens in the exhibit that was examined.

SRL: **No latent prints suitable for comparison were (developed or observed) on the remaining specimen(s).**

Example: No latent prints suitable for comparison were developed on the remaining specimens.

Visual Examination Only

Criteria: When the FS only conducts a visual examination on the specimen or entire exhibit.

SRL: **A visual examination for latent prints was conducted and no latent prints were observed on (specimen(s) or exhibit #). The (specimen(s) or exhibit #) is not suitable for further latent print processing.**

Example: A visual examination for latent prints was conducted and no latent prints were observed on the dryer sheets. The dryer sheets are not suitable for further latent print processing.

Not Suitable for Latent Print Examination

Criteria: When the specimen is not suitable for examination.

SRL: **The (specimen(s) or exhibit #) is not suitable for latent print examination**.

Example: The rubber bands are not suitable for latent print examination.

Contaminated Material

Criteria: When the FS conducts a visual examination only of the (specimen or exhibit #) and, due to the presence of contaminants, is unable to conduct further latent print processing.

SRL: **A visual examination for latent prints was conducted and no latent prints suitable for comparison were observed on (specimen(s) or exhibit #). The presence of contaminant material on (specimen(s) or exhibit #) precluded any further latent print processing.**

Example: A visual examination for latent prints was conducted and no latent prints suitable for comparison were observed on the kilo packages. The presence of contaminant material on the kilo packages precluded any further latent print processing.

SRL: **A visual examination for latent prints was conducted and no latent prints were observed on (specimen(s) or exhibit#). The presence of contaminant material on (specimen(s) or exhibit #) precluded any further latent print processing.**

Example: A visual examination for latent prints was conducted and no latent prints were observed on the kilo packages. The presence of contaminant material on the kilo packages precluded any further latent print processing.

Deferred Examination – Processing Examination – Additional Reporting Statement

Criteria: When the FS is in the processing examination stage and has received documented concurrence from either case agent or the SFS to discontinue processing the exhibit.

SRL: **Further processing of (specimen(s) or exhibit #) was deferred with the approval of (Title and name).**

Example: Further processing of exhibit 1 was deferred with the approval of SA Smith.

Comparison Examination Results

Comparisons Performed (Latent Prints)

Criteria:	Identifiable latent prints were compared to a set of known prints.
SRL:	**The _____was compared to the known (finger/palm) print card(s) of _____ (or) the above listed subjects.**
Multiple Subjects Example:	The latent prints were compared to the known palm print cards of the above listed subjects.
One Subject Example:	The latent print was compared to the known fingerprint card of Thomas Jones.

Comparison Performed (Known Prints)

Criteria:	Known print card compared to a known print card.
SRL:	**The known (finger/palm) print card of _____ was compared to the known (finger/palm) print card of _____.**
Example:	The known fingerprint card of Joe Smith was compared to the known fingerprint card of John Smith.

Source Identification Made (Latent Prints):

Criteria:	The latent print and the known print came from the same source.
SRL:	**(Indicate #) latent print(s) from (specific specimen(s)) was identified to the known (finger/palm) print card of _____, (UCN/SID (if known)).**
Example:	Five latent prints from two clear plastic bags were identified to the known fingerprint card of Thomas Jones, UCN123456789.

Source Identification Made (Known Prints)

Criteria:	The known print(s) came from the same source.
SRL:	**The known (finger/palm) print(s) of _____, (UCN/SID/DOB (if known)) was identified to the known (finger/palm) print card of _____, (UCN/SID/DOB (if known)).**
Example:	The known fingerprints of Thomas Jones, DOB 12/12/1966, were identified to the known fingerprint card of Thomas J. Jones, UCN 123456789.

Remaining Latent Prints – Additional Reporting Statement

Criteria: Remaining latent print(s) was compared and was excluded with the same individual(s).

SRL: **The remaining latent (finger/palm) print(s) was excluded from the known (finger/palm) print card(s) of _____.**

Example: The remaining latent fingerprint was excluded from the known fingerprint card of Thomas Jones.

Deferred Examination – Remaining Latent Prints – Additional Reporting Statement

Criteria: A latent print was identified to a subject in the exhibit, and the FS has received documented concurrence from either the case agent or the SFS to discontinue any further comparisons of unidentified latent prints.

SRL: **Further comparison of the unidentified latent (finger/palm) prints with the known (finger/palm) card(s) of _____ was deferred with the approval of _____. Additional comparisons to the unidentified latent print(s) in this exhibit will be made upon request.**

Example: Further comparison of the unidentified latent fingerprints with the known fingerprint card of Thomas Jones was deferred with the approval of SA John Smith. Additional comparisons to the unidentified latent print(s) in this exhibit will be made upon request.

Source Exclusion (Latent Prints)

Criteria: The latent prints(s) and the known print(s) did not come from the same source.

SRL: **(Indicate # or The) latent (fingerprint/palm) print(s) was excluded from the known (finger/palm) print card(s) of _____ (or) the above listed subjects.**

One Subject Example: One latent fingerprint was excluded from the known fingerprint card of Thomas Jones.

Multiple Subjects Example: The latent palm print was excluded from the known fingerprint card of the above listed subjects.

Source Exclusion (Known Prints)

Criteria: The known prints did not come from the same source.

SRL: **The known (finger/palm) print card(s) of _____, (UCN/SID/DOB (if known)) was excluded from the known (finger/palm) print card of _____, (UCN/SID/DOB (if known)).**

Example: The known fingerprint card of Thomas Jones, DOB 12/12/1966, was excluded from the known fingerprint card of Thomas J. Jones, UCN 123456789.

Deferred Comparison – Additional Reporting Statement

Criteria: Latent prints have not been identified to a subject in the exhibit. The FS has received documented concurrence from either the case agent or the SFS to discontinue any further comparisons.

SRL: **Further comparison of the unidentified latent (finger/palm) prints with the known (finger/palm) print card(s) of _____ was deferred with the approval of _____. Additional comparisons to the unidentified latent (finger/palm) print(s) in this exhibit will be made upon request.**

Example: Further comparison of the unidentified latent fingerprints with the known fingerprint cards of Thomas Jones and Edith Jones was deferred with the approval of SA Smith. Additional comparisons to the unidentified latent fingerprints in this exhibit will be made upon request.

Inconclusive Comparison – Lack of Features (Latent Print)

Criteria: One or more latent prints could not be identified to, or excluded from the submitted subject known prints, due to the lack of features (orientation, location, quality of detail, and/or missing key information).

SRL: **Due to the lack of features, the comparison results of the known (finger/palm print card(s) of _____ were inconclusive to (#) latent (finger/palm) print(s) from (specimen(s)).**

Example: Due to the lack of features, the comparison results of the known fingerprint card of Thomas Jones were inconclusive to one latent fingerprint from one plastic bag.

Inconclusive Comparison - Incomplete (Known Prints)

Criteria: One or more latent prints could not be identified to, or excluded from the submitted known prints, because the area needed for comparison isn't available (due to incompleteness) and/or because the known print is unclear (due to lack of clarity).

SRL: **(Due to _____) of the known (finger/palm) print card(s) of_____, the results were inconclusive when compared to _____. Additional known (_____) are required for a conclusive comparison.**

Example: Due to the lack of clarity of the known fingerprint card of Thomas Jones, the results were inconclusive when compared to the remaining unidentified latent fingerprints. Additional known clear and complete ridge detail of the tip of fingers is required for a conclusive comparison.

Known Fingerprints Standards or Subject Data Required – Additional Reporting Statement

Criteria: Known print cards or subject data is needed to conduct a comparison of the unidentified latent prints.

SRL: **(A) Known (finger/palm) print cards(s) or an (FBI UCN, SID) of (subject name or the above listed subjects) is needed to complete the comparison request.**

Example: An FBI UCN of Thomas Jones is needed to complete the comparison request.

Known Palm Print Standards – Additional Reporting Statement

Criteria: When the FS has attempted to obtain a set of palm print cards from the FBI NGI database and receives a negative result.

SRL: **After requesting known palm prints cards from the FBI NGI database and receiving a negative result, known palm print cards of _____ are needed to conduct a comparison.**

Example: After requesting known palm print cards from the FBI NGI database and receiving a negative result, known palm print cards of Thomas Jones are needed to conduct a comparison.

Automated Fingerprint Identification Results

No AFIS Suitable Latent Prints

Criteria: The exhibit contains unidentified latent print(s). However, the unidentified latent print(s) is not suitable for AFIS processing.

SRL: **An AFIS evaluation of the unidentified latent (finger/palm) print(s) led to the determination that no latent prints were suitable for AFIS processing.**

Example: An AFIS evaluation of the unidentified latent fingerprints led to the determined that no latent prints were suitable for AFIS processing.

AFIS Suitable Latent Prints

Criteria: The exhibit contains unidentified latent print(s) that is suitable for AFIS processing.

SRL: **An AFIS evaluation of the unidentified latent (finger/palm) print(s) led to the determination that _____ is suitable for AFIS processing.**

Example: An AFIS evaluation of the unidentified latent fingerprints led to the determination that three latent prints are suitable for AFIS processing.

Notification of AFIS Suitable Latent Prints

Criteria: The exhibit contains an unidentified latent print(s) that is suitable for AFIS processing. The FS chooses to notify the agency about the presence of AFIS suitable latent print(s) before searching them in AFIS.

SRL: **An AFIS evaluation of the unidentified latent (finger/palm) print(s) led to the determination that_____ is suitable for AFIS processing. Further AFIS examination will be performed upon request.**

Example: An AFIS evaluation of the unidentified latent fingerprints led to the determination that three latent prints are suitable for AFIS processing. Further AFIS examination will be performed upon request.

Elimination Prints Requested

Criteria: The exhibit contains unidentified latent prints that are suitable for AFIS processing. Circumstances in the exhibit indicate that elimination prints need to be submitted before AFIS processing is performed.

SRL: **An AFIS search of the unidentified (finger/palm) print(s) will not be conducted until elimination _____prints of _____ are submitted.**

Example: An AFIS search of the unidentified latent prints will not be conducted until elimination fingerprints of Thomas Jones are submitted.

Latent Prints and Known Prints – No Source Identification Made

Criteria: An AFIS search was conducted of the unidentified (latent prints or known prints) and no identification was made.

Latent SRL: **An AFIS search of the unidentified (latent finger/palm or known) print(s) was conducted in the (name of) database, and no identification was made.**

Example: An AFIS search of the unidentified latent print was conducted in the FBI NGI database, and no identification was made.

Known SRL: **An AFIS search of the known (finger/palm) print(s) of (name – if available) was conducted in the (name of) database, and no identification was made.**

Example: An AFIS search of the known thumb print of Thomas Jones was conducted in the FBI NGI database, and no identification was made.

Latent Prints and Known Prints – Source Identification Made

Criteria: An AFIS search was conducted and a latent print(s) or known print(s) was identified.

Latent SRL: **An AFIS search of (#) latent (finger/palm) print(s) from (specimen(s)) was conducted in the (name of) database. _____latent print(s) from the _____ was identified to a known (finger/palm) print card of _____, (UCN/SID).**

Example: An AFIS search of two latent finger prints from the plastic bag was conducted in the FBI NGI database. One latent print from the plastic bag was identified to a known fingerprint card of Thomas Jones, UCN123456789.

Known SRL: **An AFIS search was conducted with the known (finger/palm) (print/print card) of _____ and was identified to a known (finger/palm) print card of _____ (UCN/SID).**

Example: An AFIS search was conducted with the known thumbprint of Thomas Johns and was identified to a known fingerprint card of Thomas Jones, UCN123456789.

Remaining Latent Prints – Additional Reporting Statement

Criteria: No identification was made with the remaining AFIS latent print(s) searched.

SRL: **No identification was made with the remaining (#) latent print(s) searched in AFIS.**

Example: No identification was made with the remaining two latent prints searched in AFIS.

Deferred AFIS Searches – Additional Reporting Statement

Criteria: Latent prints have been searched in an AFIS database and have not been identified. The FS has received documented concurrence from either the case agent or the SFS to discontinue AFIS searches.

SRL: **Further AFIS searches of the unidentified latent print(s) were deferred with the approval of _____. Additional AFIS searches of the unidentified latent print(s) in this exhibit will be made upon request.**

Example: Further AFIS searches of the unidentified latent prints were deferred with the approval of SA Smith. Additional AFIS searches of the unidentified latent prints in this exhibit will be made upon request.

Registered in Unsolved Latent File (Optional)

Criteria: The unidentified latent print(s) searched in AFIS was registered in the AFIS unsolved latent print file.

SRL: **The unidentified latent (finger/palm) print(s) was registered in the (name) database unsolved latent print file.**

Example: The unidentified latent fingerprint was registered in the FBI NGI database unsolved latent print file.

Post AFIS Identification

Criteria: Unidentified AFIS suitable latent print(s) was registered in an unsolved AFIS latent print file. At least one of the registered latent prints was identified as the result of a comparison to a known finger or palm print card.

SRL: **A subsequent response of the registered latent print was received from the (name) unsolved latent print file. The latent print was identified to the known (finger or palm) print card(s) of _____, (UCN/SID).**

Example: A subsequent response of the registered latent print was received from the FBI NGI unsolved latent print file. A latent print was identified to the known fingerprint card of Thomas Jones, UCN123456789.

Additional Latent Print Results or Reports

Field Investigations Results

Criteria: Latent print lift card(s) was made, and photographs were taken at a field investigation and released to the SA, TFO, or DI.

SRL: On (date), Fingerprint Specialist (name) responded to (location-address) at the request of (Title and name) to process miscellaneous specimens at/in a _____for latent prints. Photographs were taken of the specimens examined, as well as the scene. (Number) latent print lift card(s) were made and released to (Title and name) at the scene.

Example: On October 1, 2013, Fingerprint Specialist Brown responded to 111 Fifth St., Arlington, VA, at the request of SA Smith to process miscellaneous specimens at a clandestine laboratory for latent print processing. Photographs were taken of the specimens examined, as well as the scene. Ten latent print lift cards were made and released to SA Smith at the scene.

Supplemental Reports

Criteria: When additional information becomes available, a supplemental LPER will be generated to reflect the additional information.

(LIMS) LPER:
1. A Supplemental Report is selected for the type of Examination Requested.
2. The Examination Results and Conclusions section will begin with the following two statements:

SRL:
1. Supplemental report to reflect XXX by (Title and name). (XXX will be replaced with additional request.)

2. Refer to the original Latent Print Examination Report dated mm/dd/yyyy.

NOTE: The date referenced will be the date the original report was approved.

Example: Supplemental report to reflect additional comparison request made by SA Smith.

Refer to the original Latent Print Examination Report dated 01/31/2013.

Amended Reports

Criteria: When corrections are required on the original report, an amended LPER will be generated to reflect the corrected information. (See LOM Chapter 73)

(LIMS) LPER:
1. An Amended Report is selected for the type of Examination Requested.
2. The Examination Results and Conclusions section will begin with the following two statements:

SRL:
1. Amended report to correct XXX. (XXX will be replaced with the corrected information).

2. Refer to the original report Latent Print Examination Report dated

mm/dd/yyyy.
NOTE: The date referenced will be the date the original report was approved.

Example: Amended report to correct the spelling of the submitted subject's name.

Refer to original Latent Print Examination Report dated 01/31/2013.

Consensus Conclusion Statements

Criteria: When the consensus panel has formulated an opinion to resolve a technical disagreement.

(LIMS) LPER:

1. Comparison is selected for the type of Examination Requested.
2. The Examination Results and Conclusions section will begin with the following two statements:

SRL:

1. **A panel of DEA Fingerprint Specialists independently reviewed the latent print(s) and formulated a consensus of opinion to resolve a difference of technical opinion between two Fingerprint Specialists initially involved in the examination.**
2. **The latent print(s) from (indicate specific specimen(s)) was excluded from the known (finger/palm) prints of _____ (UCN, if known) as a result of a consensus panel process.**

   Or:

3. **An inconclusive decision with the latent print(s) from (indicate specific specimen(s)) was effected as a result of a consensus panel process.**

Example: A panel of DEA Fingerprint Specialists independently reviewed the latent print(s) and formulated a consensus of opinion to resolve a difference of technical opinion between two Fingerprint Specialists initially involved in the examination.

The latent print from the clear plastic bag was excluded from the known fingerprints of Thomas Jones as a result of a consensus panel process.

APPENDIX 2B – ANALYSIS OF FRICTION RIDGE DETAIL

First Level Detail

A. First level detail of latent print features is the general overall direction of ridge flow in the print.

B. First level detail is not limited to a defined classification pattern.

C. First level detail can be used to determine anatomical source. (e.g., fingers, palms, and feet)

D. First level detail cannot be used alone to identify.

E. First level detail can be used to exclude under certain circumstances.

Second Level Detail

A. Second level detail is the path of a specific ridge.

B. The actual ridge path includes:

    1. The starting position of the ridge
    2. The path the ridge takes
    3. The length of the ridge path
    4. Where the ridge path stops

C. Second level detail is much more than the specific location of where a ridge terminates at a ridge ending or bifurcation, also known as friction ridge characteristics (minutiae).

D. Sequences and configurations with other ridge paths.

E. The ridge path and its length with terminations are unique.

F. The sequences and configurations of a series of ridge paths are also unique.

G. Second level details in a print cannot exist without first level details.

H. The general direction of ridge flow will exist for a specific ridge path to occur.

I. Second level detail is used in conjunction with first level detail to identify.

J. Second level detail is used in conjunction with level one detail to exclude.

Third Level Detail

A. Third level details are the shapes of the ridge structures.

B. Third level detail encompasses the morphology (edges, textures, and pore positions) of the ridge.

    1. Other specific friction skin morphology includes secondary creases, ridge breaks, scars, incipient ridges, and other imperfections.

C. Third level details are unique in their shapes, sequences, and configurations.

D. The clarity of the print might limit an examiner's ability to perceive the morphology, sequences, and configurations of third level detail.

E. The general direction of ridge flow and a specific ridge path will exist for morphology or pore positions of a ridge to be visibly present as third level detail in a print.

F. Third level detail is used in conjunction with level one and level two detail to identify.

G. Third level detail is used in conjunction with level one and level two detail to exclude.

Other Features

A. May be used in conjunction with latent print details to identify or exclude.

B. May include creases, scars, warts, paper cuts, and blisters, for example.

C. May be permanent or temporary.

D. May contain first level detail, second level detail, and third level detail.

Complex Latent Prints

A. A number of factors may be involved in the analysis of a CLP, and these factors may include:

    1. Superimposed latent prints (e.g., double taps)
    2. Deposition pressure distortion
    3. Slippage
    4. Non-contiguous ridge detail
    5. Substrate distortion
    6. Matrix distortion
    7. Development medium (incomplete ridge development)
    8. Indistinct minutiae
    9. Tonal reversal

APPENDIX 2C – DEPARTMENT OF HOMELAND SECURITY AFIS GUIDELINES

The FS:

A. Captures the latent or known print at a minimum resolution of 500 ppi (1000 ppi is recommended), calibrated for 1:1, and saved in a "TIF" file format.

B. Includes a scale in the image.

C. Fills out requested DHS Latent Case Submittal form or DHS Field Request (known prints search) form. (See SFDCC)

D. Submits DHS Latent Case Submittal form and the digital image(s) (attachment) to an electronic mail message to: REDACTED.

E. Uses the unique identifier of the exhibit as the reference number in the subject line.

F. Considers email file size limitations when attaching multiple images to a message.

G. Provides the following statements in the narrative portion of the message:

    1. "The attached image is being submitted to the Department of Homeland Security for search by the Biometric Support Center, in connection with an official investigation of a criminal matter by the Drug Enforcement Administration.

    2. The image was captured at a minimum resolution of 500 ppi, calibrated for 1:1, and saved in a "TIF" format. Please respond via electronic mail with the results of your search to: Fingerprint Specialist (name) at: REDACTED.

    3. Your assistance in this matter is appreciated. FS (name) can be reached at (phone number), if you have any questions regarding this request."

APPENDIX 2D – DEFINITION OF LATENT PRINT CONCLUSIONS

Source Identification

'Source identification' is an examiner's conclusion that two friction ridge skin impressions originated from the same source. This 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 an impression that came from a different source and insufficient friction ridge skin features in disagreement to conclude that the impressions came from different sources.

The basis for a 'source 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 impressions came from the same source and extremely weak support for the proposition that the two impressions came from different sources.

A source identification is a statement of an examiner's belief (an inductive inference) that the probability that the two impressions were made by different sources is so small that it is negligible. A source identification is not based upon a statistically-derived or verified measurement or comparison of all friction ridge skin impression features in the world's population.

Inconclusive

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

Source Exclusion

'Source exclusion' is an examiner's conclusion that two friction ridge skin impressions did not originate from the same source. The basis for a 'source exclusion' is an examiner's decision that there are sufficient friction ridge skin features in disagreement to conclude that the two impressions came from different sources.

APPENDIX 2E – SOPs FOR LATENT PRINT PROCESSING

1.0 1, 2-Indanedione-Zinc Chloride HFE-7100 (non-thermal paper) 1,6,7,8,25,36

1.1 Scope

A. 1,2-Indanedione-zinc chloride (Ind-Zn) is used on porous surfaces to develop latent prints. It reacts with the amino acids that are often present in latent print impressions. These prints can be seen without further lighting techniques, but are best visualized by the use of a laser. A different formulation of 1,2-Indanedione-zinc chloride than the one listed below should be used on thermal paper.

1.2 Limitations

A. Ind-Zn can only be used on porous surfaces and must be used prior to Ninhydrin processing.

1.3 Equipment/Materials/Reagents

A. Beakers

B. Graduated Cylinders

C. Laser

D. Analytical Balance

E. Magnetic Stirrer and Stir Bar

F. Squirt Bottle/Sprayer

G. Glass Tray

H. Storage Bottles – Dark

I. 1.2–Indanedione

J. Ethyl Acetate

K. Glacial Acetic

L. Acid Zinc

M. Chloride

N. Absolute Ethanol

O. HFE-7100

1.4 Solution Preparation

1.4.1 1,2-Indanedione Stock Solution:

A. Combine 1,2-indanedione and ethyl acetate and place on a magnetic stirrer until all of the powder has dissolved.

1. 1,2-Indanedione 4 g
2. Ethyl acetate 450 mL

B. Add the glacial acetic acid, but do not stir.

3. Glacial Acetic Acid 50 mL

C. Place into a brown bottle to store for later use.

1.4.2 Zinc Chloride Stock Solution

A. Combine and place on a magnetic stirrer until all of the powder has dissolved.

1. Zinc Chloride 8 g
2. Absolute Ethanol 200 mL

B. Place into a brown bottle to store for later use.

1.4.3 1.2-Indanedione – Zinc Chloride Working Solution

A. Combine the above ingredients into a beaker in the order that they are listed

1. 1,2-Indanedione Stock Solution 50 mL
2. Zinc Chloride Stock Solution 2 mL
3. HFE-7100 450 mL

B. Do not place the solution on a magnetic stirrer.

C. Place unused contents into a brown bottle and store for later use.

1.5 Processing Procedure

A. Apply 1,2-indanedione – zinc chloride working solution to the specimen by spraying, dipping, or squirting.

B. Allow the sample to air dry.

C. Develop in a humidity chamber at 40-80°C and 65-80% relative humidity for 10 minutes or with a steam iron.

D. View fluorescence under a laser or an alternate light source at wavelength 490 nm – 560 nm with orange goggles or band-pass barrier filter.

E. Mark latent prints.

1.6 Storage

A. Dark bottles.

1.6.1 Shelf Life

A. 1.2–Indanedione Stock Solution 12 Months

B. Zinc Chloride Stock Solution 12 Months

C. Working Solution 3 Months

1.7 Safety

A. Wear the appropriate PPE.

B. Familiarize yourself with the information found on the SDS for each chemical used in the process.

C. Dispose of working solution in waste stream.

D. When using the laser and alternate light sources:

1. Wear goggles with appropriate filters.
2. Cover skin to eliminate exposure to light.
3. Never look directly into the light.
4. Use appropriate warning device to indicate when the UV light, laser, or alternate light source is in use.

1.8 Calibration

A. Analytical balances are calibrated yearly according to manufacturer protocol.

1.9 Validation

A. See Validation Report.

2.0 1,2-Indanedione-Zinc Chloride HFE-7100 (thermal paper) [5,29]

2.1 Scope

A. 1,2-Indanedione-zinc chloride (Ind-Zn) is used on porous surfaces to develop latent prints. It reacts with the amino acids that are often present in latent print impressions. These prints can be seen without further lighting techniques, but are best visualized by the use of a laser. A different formulation of Ind-Zn chloride than the one listed below should be used on non-thermal paper.

2.2 Limitations

A. Ind-Zn can only be used on porous surfaces and must be used prior to Ninhydrin processing.

2.3 Equipment/Materials/Reagents

A. Beakers

B. Graduated Cylinders

C. Laser

D. Analytical Balance

E. Magnetic Stirrer and Stir Bar

F. Squirt Bottle/Sprayer

G. Glass Tray

H. 1,2-Indanedione

I. Zinc Chloride

J. Ethanol

K. Dichloromethane

L. Ethyl Acetate

M. HFE-7100

N. Storage Bottle - Dark

2.4 Solution Preparation

2.4.1 1,2-Indanedione-Zinc Chloride Stock Solution

A. Combine above ingredients into a beaker and place on a magnetic stirrer until all of the powder has dissolved.

1.	1,2-Indanedione	1.5 g
2.	Zinc Chloride	40 mg

3. Ethanol	1	mL
4. Dichloromethane	30	mL
5. Ethyl Acetate	70	mL

B. Place into a dark bottle to store for later use.

2.4.2 1,2-Indanedione-Zinc Chloride Working Solution

A. Combine the above ingredients into a beaker in the order that they are listed.

1. Ind-Zn Stock Solution	25	mL
2. HFE-7100	225	mL

B. Do not place the solution on a magnetic stirrer.

C. Place unused contents into a brown bottle and store for later use.

2.5 Processing Procedure

A. Apply the Working Solution to non-evidentiary paper by spraying, dipping, or squirting. The paper should be of sufficient size so the item(s) of evidence can be sandwiched between the treated papers.

B. Allow the treated paper to air dry. Use the treated paper within 24 hours of preparation.

C. Place the item(s) of evidence between the treated papers, seal in a plastic zip top bag, and leave in a dark space, unweighted, for at least 24 hours. If no prints develop at the 24-hour mark, continue to let develop for an additional 24 hours.

D. Examine item under laser or light source at 490 nm to 560 nm using orange goggles or band- pass barrier filter.

E. Mark latent prints.

2.6 Storage

A. Dark bottles.

2.6.1 Shelf Life

A. Ind-Zn Stock Solution: 6 months

B. Working Solution: 6 months

2.7 Safety

A. Wear the appropriate PPE.

B. Familiarize yourself with the information found on the SDS for each chemical used in the process.

C. Dispose of working solution in waste stream.

D. When using the laser and alternate light sources:

1. Wear goggles with the appropriate filters.
2. Cover skin to eliminate exposure to light.
3. Never look directly into the light.
4. Use appropriate warning device to indicate when the UV light, laser, or alternate light source is in use.

2.8 Calibration

A. Analytical balances are calibrated yearly according to manufacturer protocol.

2.9 Validation

A. See Validation Report.

3.0 1,2-Indanedione-Zinc Chloride Petroleum Ether (non-thermal paper) 1,6,7,8,25,39

3.1 Scope

A. 1,2-Indanedione-zinc chloride (Ind-Zn) is used on porous surfaces to develop latent prints. It reacts with the amino acids that are often present in latent print impressions. These prints can be seen without further lighting techniques, but are best visualized by the use of a laser. A different formulation of 1,2-Indanedione-zinc chloride than the one listed below should be used on thermal paper.

3.2 Limitations

A. Ind-Zn can only be used on porous surfaces and must be used prior to Ninhydrin processing.

3.3 Equipment/Materials/Reagents

A. Beakers

B. Graduated Cylinders

C. Laser

D. Analytical Balance

E. Magnetic Stirrer and Stir Bar

F. Squirt Bottle/Sprayer

G. Glass Tray

H. Storage Bottles – Dark

I. 1,2-Indanedione

J. Ethyl Acetate

K. Glacial Acetic

L. Acid Zinc

M. Chloride

N. Absolute Ethanol

O. Petroleum Ether

P. Storage Bottle - Dark

3.4 Solution Preparation

3.4.1 1,2-Indanedione Stock Solution

A. Combine 1,2-Indanedione and ethyl acetate and place on a magnetic stirrer until all of the powder has dissolved.

1. 1,2-Indanedione 4 g
2. Ethyl acetate 450 mL
3. Glacial Acetic Acid 50 mL

B. Add the glacial acetic acid, but do not stir.

C. Place into a dark bottle to store for later use.

3.4.2 Zinc Chloride Stock Solution

A. Combine and place on a magnetic stirrer until all of the powder has dissolved.

1. Zinc Chloride 8 g
2. Absolute Ethanol 200 mL

B. Place into a dark bottle to store for later use.

3.4.3 1,2-Indanedione –Zinc Chloride Working Solution

A. Combine the above ingredients into a beaker in the order that they are listed.

1. 1,2-Indanedione Stock Solution 50 mL
2. Zinc Chloride Stock Solution 2 mL
3. Petroleum Ether 450 mL

B. Do not place the solution on a magnetic stirrer.

C. Place unused contents into a dark bottle and store for later use.

3.5 Processing Procedure

A. Apply 1,2-indanedione–zinc chloride working solution to the specimen by spraying, dipping, or squirting.

B. Allow the sample to air dry and then develop in a humidity chamber at 40-80°C and 65-80% relative humidity for 10 minutes or with a steam iron.

C. View fluorescence under a laser or an alternate light source at wavelength 490 nm – 560 nm with orange goggles or band-pass barrier filter.

D. Mark latent prints.

3.6 Storage

A. Dark bottles.

3.6.1 Shelf life

A. 1,2-Indanedione Stock Solution 12 months

B. Zinc Chloride Stock Solution 12 months

C. Working Solution 3 months

3.7 Safety

A. Wear the appropriate PPE.

B. Familiarize yourself with the information found on the SDS for each chemical used in the process.

C. Dispose of working solution in waste stream.

D. When using the laser and alternate light sources:

1. Wear goggles with the appropriate filters.
2. Cover skin to eliminate exposure to light.
3. Never look directly into the light.
4. Use appropriate warning device to indicate when the UV light, laser, or alternate light source is in use.

3.8 Calibration

A. Analytical balances are calibrated yearly according to manufacturer protocol.

3.9 Validation

A. See Validation Report.

4.0 1,2-Indanedione-Zinc Chloride Petroleum Ether (thermal paper) 5,29

4.1 Scope

A. 1,2-Indanedione-zinc chloride (Ind-Zn) is used on porous surfaces to develop latent prints. It reacts with the amino acids that are often present in latent print impressions. These prints can be seen without further lighting techniques, but are best visualized by the use of a laser. A different formulation of 1,2-Indanedione-zinc chloride than the one listed below should be used on non-thermal paper.

4.2 Limitations

A. Ind-Zn can only be used on porous surfaces and must be used prior to Ninhydrin processing.

4.3 Equipment/Materials/Reagents

A. Beakers

B. Graduated Cylinders

C. Magnetic Stirrer and Stir Bar

D. Laser

E. Analytical Balance

F. Squirt Bottle/Sprayer

G. Glass Tray

H. Storage Bottles – Dark

I. 1,2-Indanedione

J. Zinc Chloride

K. Ethanol

L. Dichloromethane

M. Ethyl Acetate

N. Petroleum Ether

4.4 Solution Preparation

4.4.1 1,2-Indanedione-Zinc Chloride Stock Solution

A. Combine above ingredients into a beaker and place on a magnetic stirrer until all of the powder has dissolved.

1.	1,2-Indanedione	1.5 g
2.	Zinc Chloride	40 mg

3.	Ethanol	1 mL
4.	Dichloromethane	30 mL
5.	Ethyl Acetate	70 mL

B. Place into a dark bottle to store for later use.

4.4.2 1,2-Indanedione-Zinc Chloride Working Solution

A. Combine the above ingredients into a beaker in the order that they are listed.

1.	1,2-Indanedione-Zinc Chloride Stock Solution	25 mL
2.	Petroleum Ether	225 mL

B. Do not place the solution on a magnetic stirrer.

C. Place unused contents into a dark bottle, and store for later use.

4.5 Processing Procedure

A. Apply the working solution to non-evidentiary paper by spraying, dipping, or squirting. The paper should be of sufficient size so the item(s) of evidence can be sandwiched between the treated papers.

B. Allow the treated paper to air dry. Use the treated paper within 24 hours of preparation.

C. Place the item(s) of evidence between the treated papers, seal in a plastic zip top bag, and leave in a dark space, unweighted, for at least 24 hours.

D. If no prints develop at the 24-hour mark, continue to let develop for an additional 24 hours.

E. Examine item under laser or light source at 490 nm to 560 nm using orange goggles or band- pass barrier filter.

F. Mark latent prints.

4.6 Storage

A. Dark bottles.

4.6.1 Shelf Life

A. 1,2-indanedione-Zinc Chloride Stock Solution: 6 months

B. Working Solution: 6 months

4.7 Safety

A. Wear the appropriate PPE.

B. Familiarize yourself with the information found on the SDS for each chemical used in the process.

C. Dispose of working solution in waste stream.

D. When using the laser and alternate light sources:

1. Wear goggles with the appropriate filters
2. Cover skin to eliminate exposure to light
3. Never look directly into the light
4. Use appropriate warning device to indicate when the UV light, laser, or alternate light source is in use.

4.8 Calibration

A. Analytical balances are calibrated yearly according to manufacturer protocol.

4.9 Validation

A. See Validation Report.

5.0 1,8-Diazafluoren-9-one (DFO) [14,35,40]

5.1 Scope

A. DFO is used to develop latent prints on porous surfaces. DFO reacts with the amino acids that are present in perspiration. All developed prints will fluoresce under a laser or alternate light source.

5.2 Limitations

A. DFO cannot be used on non-porous surfaces.

5.3 Equipment/Materials/Reagents

A. Beakers

B. Glass Tray

C. Graduated Cylinders

D. Laser or Alternate Light Source

E. Magnetic Stirrer and Stir Bar

F. Oven or Dry Iron

G. Analytical Balance

H. Squirt Bottle/Sprayer

I. Storage Bottles – Dark

J. DFO

K. Ethyl Acetate

L. Glacial Acetic

M. Acid Methanol

N. Petroleum Ether

5.4 Solution Preparation

5.4.1 Stock Solution:

A. Combine and place on a magnetic stirrer until all of the DFO is dissolved.

1.	DFO	1 g
2.	Methanol	200 mL
3.	Ethyl Acetate	200 mL
4.	Glacial Acetic Acid	40 mL

5.4.2 Working Solution:

A. Dilute the stock solution with the petroleum ether to make 2 L of working solution. The solution should be a clear, gold color.

1. Stock Solution 440 mL
2. Petroleum Ether 1560 mL

5.5 Processing Procedure

A. Apply DFO to the specimen by spraying or dipping.

B. Allow specimens to dry.

C. Place in an oven at 100°C for 20 minutes.

D. View fluorescence under a laser or alternate light source at approximately 515 nm.

5.6 Storage

A. Both solutions: dark bottles.

5.6.1 Shelf Life

A. Both solutions: greater than 6 months.

5.7 Safety

A. Wear the appropriate PPE.

B. Familiarize yourself with the information found on the safety data sheet (SDS) for each chemical used in the process.

C. Dispose of used DFO in waste stream.

D. When using the laser and alternate light sources:

1. Wear goggles with the appropriate filters.
2. Cover skin to eliminate exposure to light.
3. Never look directly into the light.
4. Use appropriate warning device to indicate when the laser or alternate light source is in use.

5.8 Calibration

A. Analytical balances are calibrated yearly according to manufacturer protocol.

5.9 Validation

A. See Validation Report.

6.0 Alternate Black Powder [16,37,40]

6.1 Scope

A. Alternate Black Powder is used to process the adhesive side of many different types and colors of tape.

6.2 Limitations

A. See Tape Chart.

6.3 Equipment/Materials/Reagents

A. Brushes – Camel-Hair or another small brush

B. Petri or Shallow Dish

C. Teaspoon

D. Distilled water

E. Lightning® Black Powder

F. Liqui-Nox™ Solution

6.4 Solution Preparation

A. Working Solution:

1. Lightning® Black Powder 1 tsp
2. Liqui-Nox™ Solution (diluted 50:50 with distilled water)

B. Combine in a petri or shallow dish and stir until the solution has the consistency of shaving cream.

6.5 Processing Procedure

A. Paint the solution onto the adhesive surface with a brush.

B. Let sit for 30 to 60 seconds.

C. Rinse with a slow stream of cold tap water.

D. Allow to dry.

E. Repeat procedure if necessary.

6.6 Storage

A. None - Prepare as needed.

6.6.1 Shelf Life

A. Prepare as needed.

6.7 Safety

A. Wear the appropriate PPE.

B. Familiarize yourself with the information found on the SDS for each chemical used in the process.

6.8 Validation

A. See Validation Report.

7.0 Alternate Light Source 11,17

7.1 Scope

A. The Alternate Light Source (ALS) is a source of light that is used to examine any type of evidence for the presence of latent prints. The ALS is used before any processing is done to visualize any inherent fluorescence and in conjunction with certain dyes and processes that may result in fluorescence.

7.2 Limitations

A. Limited amount of power is available at each wavelength.

B. All examinations should be performed with the room lights off.

7.3 Equipment/Materials/Reagents

A. Safety goggles with an appropriate filter to block the emitted light but not the fluorescence.

7.4 Processing Procedure

A. Turn on the fan.

B. Turn on the lamp.

C. Use the buttons on the front of the instrument to select the wavelength.

D. Place evidence under the light and examine.

E. Mark prints.

F. Turn off the lamp.

G. Turn off the fan.

7.5 Safety

A. Always wear safety goggles with the appropriate filter - many wavelengths are available between 515 nm and 630 nm, depending on the wavelength of light being used.

B. Wear a lab coat to cover exposed skin.

C. When using the UV light and alternate light sources:

1. Wear goggles with the appropriate filters.
2. Cover skin to eliminate exposure to UV light.
3. Never look directly into the light.
4. Use appropriate warning device to indicate when the UV light or alternate light source is in use.

7.6 Calibration

A. Refer to owner's manual to see how different wavelengths are selected for viewing by the examiner.

8.0 Ardrox (Fluorescent Dye) [4,14,40]

8.1 Scope

A. Ardrox is a fluorescent dye used to make cyanoacrylate-developed prints more visible on various colored surfaces. It is used in conjunction with long-wave ultraviolet light.

8.2 Limitations

A. Must be used *after* cyanoacrylate fuming.

8.3 Equipment/Materials/Reagents

A. Beakers

B. Graduated Cylinders

C. Squirt Bottles

D. Ultraviolet Light – Long-wave

E. Ardox P133D

F. Acetone

G. Methanol

H. Isopropanol

I. Acetonitrile

J. Petroleum

K. Ether

L. Storage Bottle – Clear or Dark

8.4 Solution Preparation

A. Working Solution:

1. Ardrox P133D (undiluted)	2 mL
2. Acetone	10 mL
3. Methanol	25 mL
4. Isopropanol	10 mL
5. Acetonitrile	8 mL
6. Petroleum Ether	945 mL

B. Combine in a beaker in the order listed. DO NOT place on a magnetic stirrer.

8.5 Processing Procedure

A. Apply the developer to the specimens by dipping or using a squirt bottle.

B. Allow specimen to dry.

C. View under a long-wave UV light.

D. Mark prints.

8.6 Storage

A. Clear or dark bottles.

8.6.1 Shelf Life

A. Up to 6 months.

8.7 Safety

A. Wear the appropriate PPE.

B. Familiarize yourself with the information found on the SDS for each chemical used in the process.

C. Dispose of working solution in waste stream.

D. When using the UV and alternate light sources:

1. Wear goggles with the appropriate filters.
2. Cover skin to eliminate exposure.
3. Never look directly into the light.
4. Use appropriate warning device to indicate when the UV light or alternate light source is in use.

8.8 Validation

A. See Validation Report.

9.0 Ardrox Aqueous (Fluorescent Dye) 4,14,19,26,40,41

9.1 Scope

A. Ardrox is a fluorescent dye used to make cyanoacrylate-developed prints more visible on various colored surfaces. It is used in conjunction with a long-wave ultraviolet light source. The water-based (aqueous) Ardrox formula will not destroy the latent print or the finish on waxed surfaces or varnished surfaces of wood.

9.2 Limitations

A. Must be used *after* cyanoacrylate fuming.

9.3 Equipment/Materials/Reagents

A. Beakers

B. Graduated Cylinders

C. Squirt Bottles

D. Ultraviolet light - Long-wave Ardrox P133D

E. Distilled Water

F. Storage Bottles – Clear and Dark

9.4 Solution Preparation

A. Working Solution:

1. Ardrox P133D (undiluted) 1 mL
2. Distilled Water 100 mL
3. Synperonic N 3-6 drops

B. Combine Ardrox and distilled water in a beaker and place on a magnetic stirrer until all the Ardrox is dissolved.

C. Add 3 to 6 drops of Synperonic N and stir.

Note: Synperonic N is a surfactant which allows for a sheeting or more even covering of the item with the working solution.

9.5 Processing Procedure

A. Apply the developer to the specimens by dipping or using a squirt bottle.

B. Allow specimen to dry.

C. View under a long-wave ultraviolet light source.

D. Mark prints.

9.6 Storage

A. Clear or dark bottles.

9.6.1 Shelf Life

A. Up to 6 months.

9.7 Safety

A. Wear the appropriate PPE.

B. Familiarize yourself with the information found on the SDS for each chemical used in the process.

C. Dispose of working solution in waste stream.

D. When using the UV light and alternate light sources:

1. Wear goggles with the appropriate filters.
2. Cover skin to eliminate exposure to UV light.
3. Never look directly into the light.
4. Use appropriate warning device to indicate when the UV light or alternate light source is in use.

9.8 Validation

A. See Validation Report.

10.0 Ardrox - Methanol/Isopropanol (Fluorescent Dye) [4,14,19,26,40,41]

10.1 Scope

A. Ardrox is a fluorescent dye used to make cyanoacrylate-developed prints more visible on various colored surfaces. It is used in conjunction with a long-wave ultraviolet light source.

10.2 Limitations

A. Must be used *after* cyanoacrylate fuming.

10.3 Equipment/Materials/Reagents

A. Graduated Cylinders

B. Beakers

C. Squirt Bottles

D. Storage Bottles - Clear and Dark Ultraviolet light- Long-wave

E. Isopropanol or Methanol

F. Ardox P133D

10.4 Solution Preparation

A. Working Solution:

1. Ardrox P133D (undiluted) 5 mL
2. Methanol (or isopropanol) 500 mL

B. Combine Ardrox P133D with either methanol or isopropanol in a beaker in the order listed.

10.5 Processing Procedure

A. Apply the developer to the specimens by dipping or using a squirt bottle.

B. Allow specimen to dry.

C. View under a long-wave ultraviolet light source.

D. Mark prints.

10.6 Storage

A. Clear or dark bottles.

10.6.1 Shelf Life

A. Up to 6 months.

10.7 Safety

A. Wear the appropriate PPE.

B. Familiarize yourself with the information found on the SDS for each chemical used in the process.

C. Dispose of working solution in waste stream.

D. When using the UV light and alternate light sources:

1. Wear goggles with the appropriate filters.
2. Cover skin to eliminate exposure to UV light.
3. Never look directly into the light.
4. Use appropriate warning device to indicate when the UV light or alternate light source is in use.

10.8 Validation

A. See Validation Report.

11.0 Ardrox – Olenik (Fluorescent Dye) 4,9,14

11.1 Scope

A. Ardrox is a fluorescent dye used to make cyanoacrylate-developed prints more visible on various colored surfaces. It is used in conjunction with a long-wave ultraviolet light source.

11.2 Limitations

A. Must be used after cyanoacrylate fuming.

11.3 Equipment/Materials/Reagents

A. Beakers

B. Graduated Cylinders

C. Squirt Bottles

D. Storage Bottles - Clear and Dark

E. Ultraviolet Light – Long-wave

F. Ardrox P-133D (aka) Tracer Tech P-133D

G. Methyl Ethyl Ketone

H. Isopropanol

I. Methanol

J. Water

11.4 Solution Preparation

A. Working Solution (shake after each addition):

1.	Ardrox P-133D	1 mL
2.	Isopropyl Alcohol	9 mL
3.	Methyl Ethyl Ketone	40 mL
4.	Water	50 mL

11.5 Processing Procedure

A. Apply the developer to the specimens by spraying or using a squirt bottle.

B. Specimen may be rinsed under running water to reduce or eliminate background fluorescence.

C. Allow specimen to dry.

D. View under a long-wave ultraviolet light source.

E. Mark prints.

11.6 Storage

A. Clear or dark bottles.

11.6.1 Shelf Life

A. Indefinite.

11.7 Safety

A. Wear the appropriate PPE.

B. Familiarize yourself with the information found on the SDS for each chemical used in the process.

C. Dispose of working solution in waste stream.

D. When using the UV light and alternate light sources:

1. Wear goggles with the appropriate filters.
2. Cover skin to eliminate exposure to UV light.
3. Never look directly into the light.
4. Use appropriate warning device to indicate when the UV light or alternate light source is in use.

11.8 Validation

A. See Validation Report.

12.0 Cyanoacrylate Fuming [13,40]

12.1 Scope

A. Cyanoacrylate fuming is used to develop latent prints on nonporous specimens.

12.2 Equipment/Materials/Reagents

A. Aluminum Dish

B. Fuming Chamber

C. Heater (i.e., a hot plate)

D. Cyanoacrylate (premixed)

12.3 Solution Preparation

A. Not Applicable.

12.4 Processing Procedure

A. If a humidified chamber is available, set humidity between 70% and 80% for best results.

B. Place the specimens in the chamber.

C. Place the aluminum dish on a heating surface.

D. Add liquid cyanoacrylate to cover the bottom surface of the dish.

E. Turn the heater to the appropriate setting.

F. Secure the chamber door.

G. The cyanoacrylate begins to fume at a steady pace.

H. Allow specimens to be fumed. Fuming time varies depending on the size of the chamber.

I. Remove the specimens to look for latent prints.

J. Re-fume if necessary.

12.5 Storage

A. Original container.

12.5.1 Shelf Life

A. Indefinite.

12.6 Safety

A. Wear the appropriate PPE.

B. Familiarize yourself with the information found on the SDS for each chemical used in the process.

12.7 Validation

A. See Validation Report.

13.0 Gentian Violet [16,40]

13.1 Scope

A. Gentian Violet can be used to process many different types and colors of tape.

13.2 Limitations

A. Gentian Violet should not be used on water-soluble tapes. (See Tape Chart)

13.3 Equipment/Materials/Reagents

A. Beakers

B. Tray

C. Magnetic Stirrer and Stir Bar

D. Analytical Balance

E. Storage Bottles – Clear and Dark

F. Distilled Water

G. Gentian Violet

13.4 Solution Preparation

A. Working Solution:

1. Gentian Violet 1 g
2. Distilled Water 1000 mL

B. Combine in a beaker and place on a stirring device for approximately 25 minutes.

13.5 Processing Procedure

A. Place solution in a glass tray.

B. Dip the specimen into the solution for 1 to 2 minutes.

C. Rinse with cold tap water.

13.6 Storage

A. Clear or dark bottles.

13.6.1 Shelf Life

A. Indefinite.

13.7 Safety

A. Wear the appropriate PPE.

B. Familiarize yourself with the information found on the SDS for each chemical used in the process.

C. Dispose of working solution down the drain.

13.8 Calibration

A. Analytical balances are calibrated yearly according to manufacturer protocol.

13.9 Validation

A. See Validation Report.

14.0 Gun Bluing Solution 2,3,24

14.1 Scope

A. Gun bluing contains cupric salt, selenious acid, and an acid. Cupric ions and selenious acid are reduced by the oxidized (etched) metals of copper, aluminum, zinc, and iron. The reagent etches the cartridge's metal surface not protected by sebaceous-containing latent print residue, and deposits a dark-colored Cu- Se coating to reveal friction ridge detail. Cartridges should be first briefly fumed with cyanoacrylate ester, and then immersed into the gun bluing solution. A water bath stops the chemical reaction.

14.2 Limitations

A. Should be used after a light cyanoacrylate fuming.

B. Should over-development occur, excess gun bluing may be removed from the metal cartridge cases using acidified hydrogen peroxide.

C. The use of cyanoacrylate fuming as a pretreatment may be skipped. A clear lacquer spray can be applied to the cartridge cases to stabilize the development process and to enhance the contrast of the developed friction ridge detail.

D. A number of gun bluing products sold under various trade names can be used in a diluted solution to reveal friction ridge detail on cartridge surfaces.

E. Lacquered steel cartridges or those cartridges with a polymer jacket around the casing will resist the oxidation/reduction resulting in little or no development.

14.3 Equipment/Materials/Reagents

A. Beakers

B. Squirt Bottles

C. Graduated Cylinders

D. Storage Bottles - Clear and Dark

E. Commercial gun bluing – (i.e. Formula 44/40 Instant Gun Blue, Brass Black Metal Touch Up BB2, Gunslick Gun Blue, Perma Blue Liquid Gun Blue PB22, Outer's Gun Blue or Super Blue Extra Strength brand gun bluing)

F. Distilled Water

14.4 Solution Preparation

A. Working Solution

B. Commercial gun bluing (undiluted) 4 mL

C. Distilled Water 160 mL

14.5 Processing Procedure

A. Light fuming of cartridges with cyanoacrylate ester. (Superglue chamber not recommended - use alternate method to avoid over processing with glues fumes).

B. Immerse cartridges in the prepared reagent.

C. Gently stir and roll the cartridges in the solution.

D. Monitor closely for development.

E. Halt development by immersing in distilled water for 2 minutes.

F. Allow specimen to dry.

14.6 Storage

A. Clear or dark bottles.

14.6.1 Shelf Life

A. Undetermined; test each solution prior to use.

14.7 Safety

A. Wear the appropriate PPE.

B. Familiarize yourself with the information found on the SDS for each chemical used in the process.

C. Dispose of working solution in waste stream.

14.8 Validation

A. See Validation Report.

15.0 Iodine Fuming [34,40]

15.1 Scope

A. Iodine fumes adhere to grease or oils on porous surfaces and appear as yellow stains.

15.2 Limitations

A. Prints developed MUST be photographed immediately.

15.3 Equipment/Materials/Reagents

A. Ceramic or Glass Dish

B. Fuming Chamber

C. Heat Source (i.e., a hot plate)

D. Iodine (ACS Reagent Grade)

15.4 Processing Procedure

A. Place iodine crystals in a ceramic or glass dish.

B. Place dish into the fuming chamber.

C. Apply heat to the crystals.

D. Watch for print development.

E. Remove specimens from chamber when sufficient development has occurred.

F. Photograph.

15.5 Storage

A. Original container.

15.5.1 Shelf Life

A. Indefinite.

15.6 Safety

A. Always use under an operational hood.

B. Wear the appropriate PPE.

C. Familiarize yourself with the information found on the SDS for each chemical used in the process.

D. Dispose of working solution in waste stream.

16.0 Laser (Light Amplification of Stimulated Emission Radiation) 11,14,20

16.1 Scope

A. The laser is used to examine any type of evidence for the presence of latent prints. The laser is used before any processing is done to visualize any inherent fluorescence and in conjunction with certain dyes and processes that may result in fluorescence.

16.2 Limitations

A. Refer to the owner's manual to determine the laser output wavelength.

16.3 Equipment/Materials/Reagents

A. The laser and all of its components.

B. Safety goggles with an appropriate filter to block the laser light but not the fluorescence.

16.4 Processing Procedure

A. Turn on the laser. (Refer to owner's manual)

B. Conduct a latent print examination.

C. Turn off the lights in the room.

D. Wear goggles with appropriate filter.

E. Begin the emission of laser light as described in the owner's manual.

F. Place evidence in the viewing area and examine.

G. Mark prints.

H. Turn off emission of laser light as described in owner's manual.

I. Turn off the laser. (Refer to owner's manual)

J. Power down laser. (Refer to owner's manual)

16.5 Safety

A. Always wear safety goggles with the appropriate filter for the wavelength of light emitted from the laser. Wear a lab coat to cover exposed skin.

B. Never look directly into the light.

C. Use appropriate warning device to indicate when laser is in use.

16.6 Calibration

A. The laser is calibrated by the service engineer during service visits.

17.0 MBD (Fluorescent Dye) 4,14,40

17.1 Scope

A. MBD is a fluorescent dye used to make cyanoacrylate-developed prints more visible on various colored surfaces.

17.2 Limitations

A. Must be used after cyanoacrylate fuming.

17.3 Equipment/Materials/Reagents

A. Alternate Light Source

B. Beakers

C. Glass Tray

D. Graduated Cylinders

E. Magnetic Stirrer and Stir Bar

F. Analytical Balance

G. Squirt Bottles

H. Acetone

I. Isopropanol

J. 7-P-methoxybenzylamino-4nitrobenz-2 oxa-1-3-diazole (MBD)

K. Methanol

L. Petroleum Ether

M. Storage Bottles – Dark

17.4 Solution Preparation

17.4.1 Stock Solution

A. Combine in a beaker and place on a magnetic stirrer until all the MBD is dissolved.

1. MBD 1 g
2. Acetone 1000 mL

17.4.2 Working Solution

A. Combine in a beaker in the order listed. DO NOT place on a stirrer.

1. MBD Stock Solution 10 mL

2.	Methanol	30 mL
3.	Isopropanol	10 mL
4.	Petroleum Ether	950 mL

17.5 Processing Procedure

A. Apply the working solution to the specimen by dipping or squirting.

B. View fluorescence under an alternate light source at wavelengths in the mid-400 nm range.

C. Mark prints.

17.6 Storage

A. Dark bottles.

17.6.1 Shelf Life

A. Stock Solution: Indefinite

B. Working Solution: Up to 6 months

17.7 Safety

A. Wear the appropriate PPE.

B. Familiarize yourself with the information found on the SDS for each chemical used in the process.

C. Dispose of working solution in waste stream.

D. When using the laser and alternate light sources:

1. Wear goggles with the appropriate filters.
2. Cover skin to eliminate exposure to light.
3. Never look directly into the light.
4. Use appropriate warning device to indicate when the laser or alternate light source is in use.

17.8 Calibration

A. Analytical balances are calibrated yearly according to manufacturer protocol.

17.9 Validation

A. See Validation Report.

18.0 Ninhydrin (Acetone Base) [27,31,40]

18.1 Scope

A. Ninhydrin is used to develop prints on porous surfaces. It reacts with the amino acids that are present in perspiration.

18.2 Limitations

A. Use before physical developer.

18.3 Equipment/Materials/Reagents

A. Beakers

B. Brush

C. Glass Tray

D. Magnetic Stirrer and Stir Bar

E. Graduated Cylinders

F. Humidity Chamber Steam Iron

G. Analytical Balance

H. Sprayer

I. Acetone

J. Ninhydrin

K. Storage Bottle - Dark

18.4 Solution Preparation

A. Working Solution:

1. Ninhydrin 6 g
2. Acetone 1000 mL

B. Combine in a beaker and place on a magnetic stirrer until the Ninhydrin has dissolved.

18.5 Processing Procedure

A. Apply the working solution to the specimen by spraying, dipping, or painting.

B. Allow specimen to dry.

C. Place in a humidity cabinet set at 60%-70% or use a steam iron.

18.6 Storage

A. Dark bottles.

18.6.1 Shelf Life

A. Up to 1 year.

18.7 Safety

A. Wear the appropriate PPE.

B. Familiarize yourself with the information found on the SDS for each chemical used in the process. Dispose of working solution in waste stream.

18.8 Calibration

A. Analytical balances are calibrated yearly according to manufacturer protocol.

18.9 Validation

A. See Validation Report.

19.0 Ninhydrin (Hexane Base)

19.1 Scope

A. Ninhydrin is used to develop prints on porous surfaces. It reacts with amino acids that are present in perspiration.

19.2 Limitations

A. Use before physical developer.

19.3 Equipment/Material/Reagents

A. Beakers and/or Graduate Cylinders Brush

B. Glass Tray

C. Squirt bottle and/or Sprayer

D. Humidity Chamber

E. Steam Iron

F. Magnetic stirrer and stir bars, or glass stirrer (rod)

G. Analytic balance

H. Heating element – hot plate

I. Ninhydrin

J. Methanol

K. Ethyl Acetate

L. Hexane

M. Storage Bottle - Dark

19.4 Solution Preparation

A. Working Solution:

1.	Ninhydrin	20 g
2.	Methanol	50 mL
3.	Ethyl Acetate	750 mL
4.	Hexane	3200 mL

B. Combine Ninhydrin and methanol in a beaker.

C. Place beaker on a hot plate or other heating type element.

D. Stir continuously using a glass rod or a magnetic stirrer until all crystals are completely dissolved.

E. Transfer dissolved Ninhydrin crystals to a dark storage bottle.

F. Add ethyl acetate.

G. Add hexane.

H. Stir or shake.

19.5 Processing Procedure

A. Apply the working solution to the specimen by spraying, dipping, or painting.

B. Allow specimen to dry.

C. Place in a humidity cabinet set at 60%-75% and/or use a steam iron.

19.6 Storage

A. Dark bottles.

19.6.1 Shelf Life

A. Test periodically.

19.7 Safety

A. Wear the appropriate PPE.

B. Familiarize yourself with the information found on the SDS for each chemical used in the process.

C. Dispose of working solution in waste stream.

19.8 Calibration

A. Analytical balances are calibrated according to manufacture protocol.

19.9 Validation

A. See Validation Report.

20.0 Ninhydrin (HFE-7100) 9,27,31,40

20.1 Scope

A. Ninhydrin is used to develop prints on porous surfaces. It reacts with the amino acids that are present in perspiration.

20.2 Limitations

A. Use before physical developer.

20.3 Equipment/Materials/Reagents

A. Beakers

B. Brush

C. Glass Tray

D. Graduated Cylinders

E. Tray

F. Humidity Chamber

G. Separatory funnel

H. Magnetic Stirrer and Stir Bar

I. Analytical Balance

J. Sprayer

K. Storage Bottles – Dark

L. Absolute Ethanol Ethyl

M. Acetate

N. Ninhydrin

O. Glacial Acetic Acid

P. Novec fluid HFE-7100

20.4 Solution Preparation

A. Working Solution:

1.	Ninhydrin	5 g
2.	Absolute Ethanol	45 mL
3.	Ethyl Acetate	2 mL
4.	Glacial Acetic Acid	5 mL

5. Novec fluid HFE-7100 1 L

20.5 Procedure:

A. Combine ninhydrin and ethanol in a beaker, and place on a magnetic stirrer until the ninhydrin has completely dissolved.

B. Slowly add 2 mL of ethyl acetate.

C. Slowly add 5 mL of glacial acetic acid.

D. Add 1 L of HFE-7100.

E. Allow to stand for 30 minutes. Two separate layers will form.

F. Discard the top layer. A large separatory funnel can be used to facilitate the separation of the two solutions.

20.5.1 Processing Procedure

A. Apply the working solution to the specimen by spraying, dipping, or painting.

B. Allow specimen to dry.

C. Place in a humidity cabinet set at 60%-70% or use a steam iron.

20.6 Storage

A. Dark bottles.

20.6.1 Shelf Life

A. Up to 1 year.

20.7 Safety

A. Wear the appropriate PPE.

B. Familiarize yourself with the information found on the SDS for each chemical used in the process.

C. Dispose of working solution in waste stream.

20.8 Calibration

A. Analytical balances are calibrated yearly according to manufacturer protocol.

20.9 Validation

A. See Validation Report.

21.0 Ninhydrin (Petroleum Ether Base) [27,31,40]

21.1 Scope

A. Ninhydrin is used to develop prints on porous surfaces. It reacts with the amino acids that are present in perspiration.

21.2 Limitations

A. Use before physical developer.

21.3 Equipment/Materials/Reagents

A. Beakers

B. Brush

C. Glass Tray

D. Steam Iron

E. Graduated Cylinders

F. Magnetic Stirrer and Stir Bar

G. Humidity Chamber

H. Analytical Balance

I. Sprayer

J. Storage Bottles – Dark

K. Isopropanol

L. Methanol

M. Ninhydrin

N. Petroleum Ether

21.4 Solution Preparation

A. Working Solution:

1.	Ninhydrin	5 g
2.	Methanol	30 mL
3.	Isopropanol	40 mL
4.	Petroleum Ether	930 mL

B. Combine ninhydrin and methanol in a beaker, and place on a magnetic stirrer until the Ninhydrin has dissolved.

C. Combine with isopropanol, then add the mixture to the petroleum ether.

21.5 Processing Procedure

A. Apply the working solution to the specimen by spraying, dipping, or painting.

B. Allow specimen to dry.

C. Place in a humidity cabinet set at 60%-70% or use a steam iron.

21.6 Storage

A. Dark bottles.

21.7 Shelf Life

A. Up to 1 year.

21.8 Safety

A. Wear the appropriate PPE.

B. Familiarize yourself with the information found on the SDS for each chemical used in the process.

C. Dispose of working solution in waste stream.

21.9 Calibration

A. Analytical balances are calibrated yearly according to manufacturer protocol.

21.10 Validation

A. See Validation Report.

22.0 Physical Developer [32,40]

22.1 Scope

A. Physical developer (PD) is used to develop latent prints on porous surfaces. It has also been found to be very effective in developing latent prints on paper currency. PD is normally applied after the DFO and ninhydrin treatments.

22.2 Limitations

A. Stains on blueprints, photographs, or photocopies caused by the PD treatment cannot be removed without defacing the specimens.

B. PD will negate the silver nitrate process: therefore, do not use them in conjunction with each other. Treatment with ninhydrin and DFO must be done before PD.

22.3 Equipment/Materials/Reagents

A. Beakers

B. Glass Trays

C. Graduated Cylinders

D. Iron

E. Magnetic Stirrer and Stir Bars

F. Orbital Shaker

G. Analytical Balance

H. Citric Acid (Reagent Grade)

I. Distilled Water

J. n-Dodecylamine Acetate

K. Ferric Nitrate (100% purity)

L. Ferric Ammonium Sulfate (Reagent Grade)

M. Maleic Acid

N. Silver Nitrate (Reagent Grade, >99%)

O. Sodium Hypochlorite (or Household Bleach)

P. Synperonic-N

Q. Storage Bottle - Dark

22.4 Solution Preparation

22.4.1 Solution 1 – Maleic Acid

A. Combine in a beaker and place on a magnetic stirrer until the maleic acid has dissolved:

1. Distilled Water 1000 mL
2. Maleic Acid 25 g

22.4.2 Solution 2 – Redox

A. Combine in a beaker and place on a magnetic stirrer until the solids have dissolved.

1. Ferric Nitrate 30 g
2. Ferrous Ammonium Sulfate 80 g
3. Citric Acid 20 g
4. Distilled Water 1000 mL

22.4.3 Solution 3 – Detergent

A. Combine in a beaker and place on a magnetic stirrer until the solids have dissolved.

1. n-Dodecylamine Acetate 3 g
2. Synperonic-N 4 g
3. Distilled Water 1000 mL

22.4.4 Solution 4 – Silver Nitrate

A. Combine in a beaker and place on a magnetic stirrer until the silver nitrate has dissolved.

1. Silver Nitrate 200 g
2. Distilled Water 1000 mL

22.4.5 Working Solution

A. Combine in a beaker in the order that they are listed. Place solution 2 in a beaker on a magnetic stirrer, then add solutions 3 and 4. Stir for 3-5 minutes.

1. Solution 2 1000 mL
2. Solution 3 40 mL
3. Solution 4 50 mL
4. Sodium Hypochlorite - IF NEEDED
   a. Combine and place in a beaker.
   b. Sodium Hypochlorite 500 mL
   c. Distilled water 500 mL

NOTE: The sodium hypochlorite solution darkens latent prints developed with PD, lightens the background, and removes any ninhydrin stains that may still be present on the specimen. This process is especially effective on paper bags and paper currency.

22.5 Processing Procedure

22.5.1 Tray 1 - Solution 1

A. Place solution in a glass tray.

B. Place specimens in the glass tray.

C. Submerge specimens and let sit for 5 minutes (if bubbling occurs, let sit until bubbling ceases).

22.5.2 Tray 2 - Working Solution

A. Place a glass tray on an orbital shaker.

B. Place solution in the glass tray.

NOTE: Approximately 15 check-sized specimens can normally be processed with 1 liter of working solution.

C. Turn on shaker to achieve a gentle rocking motion (if an orbital shaker is not available, rock the tray back and forth manually).

D. Place specimens in the glass tray.

E. Submerge specimens in the solution for 5-15 minutes. The amount of time will depend on the number of specimens.

22.5.3 Tray 3 - Water Rinse.

A. Place water in a tray.

B. Place specimens in the tray.

C. Be sure to rinse specimens before they dry. The chemicals in Tray 2 may cause the specimens to become brittle upon drying, which could result in damage to or destruction of the specimens.

D. Sodium Hypochlorite - IF NOT NECESSARY, PROCEED TO DRYING STEP

E. Place specimens in the solution for 15 seconds

F. Thoroughly rinse with water

22.6 Drying

A. Specimens can be air dried or dried with an iron.

22.7 Storage

A. Solution 1-3: Clear or dark bottles.

B. Solution 4: Dark bottles.

22.7.1 Shelf Life

A. Solution 1-2: Indefinite.

B. Solution 3-4: Up to one year.

22.8 Safety

A. Wear the appropriate PPE.

B. Familiarize yourself with the information found on the SDS for each chemical used in the process.

C. Dispose of working solution in waste stream.

D. All silver containing solutions must be disposed of separately.

E. Maleic acid can be disposed of down the drain with water running.

22.9 Calibration

A. Analytical balances are calibrated yearly according to manufacturer protocol.

22.10 Validation

A. See Validation Report.

23.0 Powders [38,40]

23.1 Scope

A. Powdering is the application of finely ground, colored powder to a nonporous object to make latent prints visible. The powder adheres to moisture, oils, and other residues. There are different types and colors of powder.

23.2 Limitations

A. Use only on nonporous items.

23.3 Equipment/Materials/Reagents

A. Camel-hair brush

B. Cotton

C. Feather duster

D. Fiberglass filament brush

E. Magna brush wand

F. Paper

G. Black powder

H. Gray powder

I. White powder

J. Magnetic powder

23.4 Processing Procedure

23.4.1 Non-magnetic Powders

A. Pour needed amount of powder into a small pile.

B. Dip tips or bristles of brush into powder.

C. Apply a small amount of powder onto the surface and begin to brush.

D. Brush in the direction of any ridges that begin to appear.

E. Build powder onto ridges and stop when the latent print reaches a point of sufficient clarity.

F. Clean the excess powder from between the ridges using a brush or cotton.

G. When processing large areas:

1. Dip cotton into the powder and lightly wipe over the surface.

2. When the outline of a print appears, begin using the brush for full development.

23.4.2 Magnetic Powders

A. Place the magna brush wand, with the 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 in a circular motion, making sure that the powder touches the surface and not the wand.

C. Upon completion of development, release excess powder into the container by disengaging the magnet by withdrawing the control rod.

D. Re-engage the magnet, and pass the clean wand over the developed print and surrounding area to remove excess powder.

23.5 Storage

A. Original containers.

23.5.1 Shelf Life

A. Indefinite.

23.6 Safety

A. Wear the appropriate PPE.

B. Familiarize yourself with the information found on the SDS for each chemical used in the process.

24.0 RAM (Fluorescent Dye) [4,14,40]

24.1 Scope

A. RAM is used to dye cyanoacrylate-developed latent prints. These prints can be better visualized by the use of an alternate light source or laser. The dye can be used on all colors of nonporous surfaces.

24.2 Limitations

A. RAM can only be used after treating the specimen with cyanoacrylate fuming.

24.3 Equipment/Materials/Reagents

A. Beakers

B. Glass Tray

C. Graduated Cylinders

D. Laser or Alternate Light Source

E. Magnetic Stirrer and Stir Bar

F. Analytical Balance

G. Squirt Bottle/Sprayer

H. Storage Bottles - Dark

I. Rhodamine 6G (dye content 99%)

J. 7-P-methoxybenzylamino-4-nitrobenz-2 oxa-1-3-diazole (MBD)

K. Ardrox P133D

L. Methanol

M. Acetone

N. Isopropanol

O. Acetonitrile

P. Petroleum Ether

24.4 Solution Preparation

24.4.1 Stock Solution 1 (Rhodamine 6G)

A. Combine and place on a magnetic stirrer until all of the dye is dissolved. Set aside for later use.

1.	Rhodamine 6G	1 g
2.	Methanol	1000 mL

24.4.2 Stock Solution 2 (MBD)

A. Combine and place on a magnetic stirrer until all of the dye is dissolved. Set aside for later use.

1.	MBD	1 g
2.	Acetone	1000 mL

B. Use undiluted, directly from the container.

1. Ardrox P133D

24.4.3 RAM Working Solution:

A. Combine the below ingredients into a beaker in the order that they are listed. Do not place the solution on a magnetic stirrer.

1.	Stock Solution 1	3 mL
2.	Ardrox P133D	2 mL
3.	Stock Solution 2	7 mL
4.	Methanol	20 mL
5.	Isopropanol	10 mL
6.	Acetonitrile	8 mL
7.	Petroleum Ether	950 mL

24.5 Processing Procedure

A. Apply RAM to the specimen by spraying, dipping, or squirting.

B. View fluorescence under a laser or alternate light source at wavelengths 365 nm-540 nm.

C. Mark prints.

24.6 Storage

A. Dark bottles.

24.6.1 Shelf Life

A. Stock Solutions 1 and 2: indefinite

B. Working solution (without petroleum ether): Indefinite

1. Working solution (with petroleum ether): 30 days then check for separation; if solution is separated, shake vigorously.
2. If solution does not return to suspension, discard.

24.7.1 Safety

A. Wear the appropriate PPE.

B. Familiarize yourself with the information found on the SDS for each chemical used in the process.

C. Dispose of used RAM in waste stream.

D. When using the UV light, laser and alternate light sources:

1. Wear goggles with the appropriate filters.
2. Cover skin to eliminate exposure to light.
3. Never look directly into the light.
4. Use appropriate warning device to indicate when the UV light, laser, or alternate light source is in use.

24.8 Calibration

A. Analytical balances are calibrated yearly according to manufacturer protocol.

24.9 Validation

A. See Validation Report.

25.0 Reflective Ultraviolet Imaging System (RUVIS)

25.1 Scope

A. The Reflective Ultraviolet Imaging System (RUVIS), when coupled with a short wave UV light source, is used to detect latent prints without treatment on non-porous types of evidence. Cyanoacrylate treatment will further enhance the results of the RUVIS, increasing the number of different surface types where a latent can be visualized and photographed.

25.2 Limitations

A. All examinations must be performed in conjunction with a UV light (short wave). The screen on the RUVIS is low resolution.

25.3 Equipment/Material/Reagents

A. Refer to owner's manual for detailed instructions for camera usage (image capture device).

25.4 Processing Procedure

A. Turn on RUVIS.

B. Place evidence under lens.

C. Turn on and position UV light.

D. Focus RUVIS and adjust UV light until prints come into view.

E. Mark prints.

F. Photograph prints.

G. Turn off RUVIS.

25.5 Safety

A. Wear safety goggles, gloves, and lab coat to cover exposed skin.

B. Never look directly into the UV light.

26.0 Rhodamine 6G (Fluorescent Dye) [4,14,40]

26.1 Scope

A. Rhodamine 6G is a fluorescent dye used to make cyanoacrylate developed prints more visible on various colored surfaces.

26.2 Limitations

A. Must be used after cyanoacrylate fuming.

26.3 Equipment/Materials/Reagents

A. Beakers

B. Glass Tray

C. Graduated Cylinders

D. Laser or Alternate Light Source

E. Magnetic Stirrer and Stir Bar

F. Analytical Balance

G. Squirt Bottles or Sprayer

H. Storage Bottles - Dark Acetone

I. Acetonitrile

J. Isopropanol

K. Methanol

L. Petroleum Ether

M. Rhodamine 6G (dye content ≥99%)

26.4 Solution Preparation

26.4.1 Stock Solution

A. Combine in a beaker and place on a magnetic stirrer until all the Rhodamine 6G is dissolved:

1.	Rhodamine 6G	1 g
2.	Methanol	1000 mL

26.4.2 Working Solution

A. Combine in a beaker in the order listed. DO NOT place on a stirrer.

1.	Rhodamine 6G Stock Solution	3 mL
2.	Acetone	15 mL
3.	Acetonitrile	10 mL
4.	Methanol	15 mL
5.	Isopropanol	32 mL
6.	Petroleum Ether	925 mL

26.5 Processing Procedure

A. Apply the Working Solution to the specimen by dipping, spraying, or squirting.

B. View fluorescence under a laser or alternate light source at wavelengths in upper 400 nm - 530 nm range.

C. Mark prints.

26.6 Storage

A. Dark bottles.

26.6.1 Shelf Life

A. Stock Solution: Indefinite.

B. Working Solution: Up to 6 months.

26.7 Safety

A. Wear the appropriate PPE.

B. Familiarize yourself with the information found on the SDS for each chemical used in the process.

C. Dispose of working solution in waste stream.

D. When using the laser and alternate light sources:

1. Wear goggles with the appropriate filters.
2. Cover skin to eliminate exposure to light.
3. Never look directly into the light.
4. Use appropriate warning device to indicate when the laser or alternate light source is in use.

26.8 Calibration

A. Analytical balances are calibrated yearly according to manufacturer protocol.

26.9 Validation

A. See Validation Report.

27.0 Rhodamine 6G - Aqueous (Fluorescent Dye) [4,10,12,14,18,21,22,23,40]

27.1 Scope

A. Rhodamine 6G is a fluorescent dye used to make cyanoacrylate developed prints more visible on various colored surfaces. The water-based (aqueous) formula will not destroy the latent print(s) or the finish on waxed surfaces or varnished surfaces of wood.

27.2 Limitations

A. Must be used after cyanoacrylate fuming.

27.3 Equipment/Materials/Reagents

A. Beakers

B. Glass Tray

C. Graduated Cylinders

D. Laser or Alternate Light Source

E. Magnetic Stirrer and Stir Bars

F. Analytical Balance

G. Squirt Bottles or Sprayer Storage Bottles - Dark

H. Distilled Water

I. Rhodamine 6G (dye content ≥99%)

J. Synperonic N

27.4 Solution Preparation

A. Working Solution:

1. Rhodamine 6G 0.1 g
2. Distilled Water 1000 mL
3. Synperonic N 3-6 drops

B. Combine Rhodamine 6G and distilled water in a beaker, and place on a magnetic stirrer until all the Rhodamine 6G is dissolved.

C. Add 3 to 6 drops of Synperonic N and stir.

Note: Synperonic N is a surfactant which allows for a sheeting or more even covering of the item with the working solution.

27.5 Processing Procedure

A. Apply the Working Solution to the specimen by dipping, spraying, or squirting.

B. View fluorescence under a laser or alternate light source at wavelengths in upper 400 nm - 530 nm range.

C. Mark prints.

27.6 Storage

A. Dark bottles.

27.6.1 Shelf Life

A. Working Solution: Up to 6 months.

27.7 Safety

A. Wear the appropriate PPE.

B. Familiarize yourself with the information found on the SDS for each chemical used in the process.

C. Dispose of working solution in waste stream.

D. When using the laser and alternate light sources:

1. Wear goggles with the appropriate filters.
2. Cover skin to eliminate exposure to light.
3. Never look directly into the light.
4. Use appropriate warning device to indicate when the laser or alternate light source is in use.

27.8 Calibration

A. Analytical balances are calibrated yearly according to manufacturer protocol.

27.9 Validation

A. See Validation Report.

28.0 Rhodamine 6G – Methanol/Isopropanol (Fluorescent Dye) [4,10,12,14,18,21,22,23,40]

28.1 Scope

A. Rhodamine 6G is a fluorescent dye used to make cyanoacrylate developed prints more visible on various colored surfaces.

28.2 Limitations

A. Must be used after cyanoacrylate fuming.

28.3 Equipment/Materials/Reagents

A. Beakers

B. Glass Tray

C. Graduated Cylinders

D. Laser or Alternate Light Source

E. Magnetic Stirrer and Stir Bar

F. Analytical Balance

G. Squirt Bottles or Sprayer Storage Bottles - Dark

H. Isopropanol

I. Methanol

J. Rhodamine 6G (dye content ≥99%)

28.4 Solution Preparation

A. Working Solution:

1.	Rhodamine 6G	0.1 g
2.	Methanol (or Isopropanol)	1000 mL

B. Combine in a beaker and place on a magnetic stirrer until all the Rhodamine 6G is dissolved.

28.5 Processing Procedure

A. Apply the working solution to the specimen by dipping, spraying, or squirting.

B. View fluorescence under a laser or alternate light source at wavelengths in upper 400 nm - 530 nm range.

C. Mark prints.

28.6 Storage

A. Dark bottles.

28.6.1 Shelf Life

A. Working Solution: Up to 6 months.

28.7 Safety

A. Wear the appropriate PPE.

B. Familiarize yourself with the information found on the SDS for each chemical used in the process.

C. Dispose of working solution in waste stream.

1. When using the laser and alternate light sources:
2. Wear goggles with the appropriate filters.
3. Cover skin to eliminate exposure to light.
4. Never look directly into the light.
5. Use appropriate warning device to indicate when the laser or alternate light source is in use.

28.8 Calibration

A. Analytical balances are calibrated yearly according to manufacturer protocol.

28.9 Validation

A. See Validation Report.

29.0 Silver Nitrate [28,40]

29.1 Scope

A. Silver Nitrate is used to develop latent prints on porous surfaces. It reacts with the sodium chloride content in perspiration.

29.2 Limitations

A. Stains on blueprints, photographs, or photostats from the silver nitrate treatment cannot be removed without defacing the specimen.

B. Latent prints developed on certain types of glossy paper will often disappear within hours. Photograph as soon as possible.

29.3 Equipment/Materials/Reagents

A. Beakers

B. Brush

C. Glass Tray

D. Graduated Cylinders

E. High-intensity light

F. Magnetic Stirrer and Stir Bar

G. Analytical Balance

H. Storage Bottles - Dark and Glass

I. Distilled Water

J. Ethanol

K. Silver Nitrate (Reagent Grade, purity $\geq$99%)

29.4 Solution Preparation

29.4.1 Water Base

A. Combine in a beaker and place on a magnetic stirrer for approximately 10 minutes or until all of the silver nitrate crystals have dissolved.

1. Silver Nitrate 30 g
2. Distilled Water 1000 mL

29.4.2 Alcohol Base

A. Combine the silver nitrate and distilled water in a beaker, and place on a magnetic stirrer until all of the crystals have dissolved. Add this solution to the ethanol.

1.	Silver Nitrate	30 g
2.	Distilled Water	100 mL
3.	Ethanol	1000 mL

29.5 Processing Procedure

A. Apply either solution by dipping or painting.

B. Allow specimen to dry.

C. Develop prints by exposing specimen to high-intensity light or sunlight.

29.6 Storage

A. Dark glass bottles.

29.6.1 Shelf Life

A. Up to 1 year.

29.7 Safety

A. Wear the appropriate PPE.

B. Familiarize yourself with the information found on the SDS for each chemical used in the process.

C. Dispose of working solution in waste stream.

29.8 Calibration

A. Analytical balances are calibrated yearly according to manufacturer protocol.

29.9 Validation

A. See Validation Report.

30.0 Sticky-Side Powder 2,16,40

30.1 Scope

A. Sticky-Side Powder is used to process the adhesive side of many different types and colors of tape.

30.2 Limitations

A. See Tape Chart.

30.3 Equipment/Materials/Reagents

A. Brushes: Camel-Hair or another Small Brush

B. Petri or Shallow Dish

C. Distilled Water

D. Photo-Flo™ 200 Solution

E. Sticky-Side Powder

30.4 Solution Preparation

A. Working Solution:

1. Sticky-Side Powder 1 tsp
2. Photo-Flo™ 200 Solution (diluted 50:50 with distilled water)

B. Place sticky-side powder in a petri or shallow dish. Add diluted Photo-Flo™ 200 Solution, and stir until the mixture has the consistency of thin paint.

30.5 Processing Procedure

A. Paint the solution onto the adhesive surface with a brush.

B. Let sit for 30 to 60 seconds.

C. Rinse with a slow stream of cold tap water.

D. Allow to dry.

E. Repeat procedure if necessary.

30.6 Storage

A. None - Prepare as needed.

30.6.1 Shelf Life

A. None - Prepare as needed.

30.7 Safety

A. Wear the appropriate PPE.

B. Familiarize yourself with the information found on the SDS for each chemical used in the process.

30.8 Validation

A. See Validation Report.

31.0 Titanium Dioxide (TiO2) 30,39

31.1 Scope

A. Titanium dioxide (TiO2) is used to process the adhesive side of dark tape (example black electrical tape). It can also develop latent prints on the non-adhesive side as well.

31.2 Limitations

A. See Tape Chart. (See 34.0)

31.3 Equipment/Materials/Reagents

A. Brushes – Camel-Hair or another Small Brush

B. Weigh Boat or Tray

C. Distilled Water

D. Photo-Flo™ 200 Solution

E. Titanium Dioxide (TiO2)

31.4 Solution Preparation

31.4.1 Working Solution:

A. Equal parts of titanium dioxide (TiO2) and Kodak Photo-Flo, yielding a 50% concentration

B. Place titanium dioxide (TiO2) powder in a weigh boat or tray.

C. Add diluted Photo-Flo 200 Solution and stir until the mixture has the consistency of pancake batter.

31.4.2 Working Solution (Alternate mixture):

A. Equal parts Kodak Photo-Flo, water and titanium dioxide (TiO2).

B. Mix alternate mixture until a milk-like mixture is achieved.

31.5 Processing Procedure

A. With a brush, paint the mixture on the adhesive side of the tape or dip the adhesive side in a tray.

B. Let sit for 30 to 45 seconds.

C. Rinse with a slow stream of tap water.

D. Allow to dry.

E. Photograph developed latent prints.

31.6 Storage

A. None - Prepare as needed.

31.6.1 Shelf Life

A. None - Prepare as needed.

31.7 Safety

A. Wear the appropriate PPE.

B. Familiarize yourself with the information found on the SDS for each chemical used in the process.

C. Dispose of working solution in waste stream.

31.8 Validation

A. See Validation Report.

32.0 Ultraviolet (UV) Light [11,17]

32.1 Scope

A. The ALS-UV 2000U UV light is an alternate light source used to examine any type of evidence for the presence of latent prints. The UV light is used before any processing is done to visualize any inherent fluorescence and in conjunction with certain dyes and processes that may result in fluorescence.

32.2 Limitations

A. Only 365 nm light is available.

B. All examinations should be performed with the room lights off.

32.3 Equipment/Materials/Reagents

A. ALS-UV 2000U UV light source.

B. Safety goggles with an appropriate filter to block the emitted light but not the fluorescence.

32.4 Processing Procedure

A. Turn on the UV light.

B. Wait a few minutes in order to reach optimum power.

C. Place evidence under the light and examine.

D. Mark prints.

E. Turn off the UV light.

32.5 Safety

A. Always wear safety goggles with the appropriate filter - typically 515 nm or 530 nm.

B. Wear a lab coat to cover exposed skin.

C. Never look directly into the light.

D. Use appropriate warning device to indicate when the UV light is in use.

33.0 Wetwop™ [15,33]

33.1 Scope

A. Black and white Wetwop™ is a commercially prepared solution for developing latent prints on several surfaces including duct tape, adhesive bandages, paper backed labels, masking tape, clear tape, cloth and plastic surgical tapes, packing labels, double-sided foam tape, adhesive side of 3M Post-it ® notes, frosted tape, black electrical tape, latex gloves, and shelf or contact papers.

33.2 Limitations

A. See Tape Chart. (See 34.0)

33.3 Equipment/Materials/Reagents

A. Beaker or Flat Dish

B. Camel-Hair Brush

C. Wetwop™ (white or black)

33.4 Solution Preparation

A. Working Solution:

1. Lightning Powder and Company, Inc., Catalog No. 1-0077 Wetwop™ - black
2. Lightning Powder and Company, Inc., Catalog No. 1-0078 Wetwop™ - white.

33.5 Processing Procedure

A. Place test prints on the type of adhesive surfaces similar to that being processed in casework.

B. Shake the bottle of Wetwop™ thoroughly and pour a small amount into a beaker or dish.

C. Using a camel-hair brush, apply Wetwop™ to the adhesive side of the tape with a painting action and completely cover the surface.

D. Allow solution to sit for about 15-30 seconds, and rinse the solution off the adhesive surface with a gentle stream of tap water.

E. Once the surface is rinsed, set the item aside and allow to dry.

F. A visual examination is conducted and the results are photographed.

33.6 Storage

A. Manufacturer’s containers.

33.6.1 Shelf Life

A. See manufacturer’s recommendations.

33.7 Safety

A. Wear the appropriate personal PPE.

B. Familiarize yourself with the information found on the SDS for each chemical used in the process.

33.8 Validation

A. See Validation Report.

34.0 Tape Chart – Processing the Adhesive Side of Tape

Method	Color	Brand	Description	Width	Alternate Method
Gentian Violet	CLEAR		Ordinary Scotch Tape	1"	Contrasting Wetwop,
	CLEAR	3M Transpore	Textured Tape	1"	Alternate Black Powder
	OFF WHITE	3M Tartan	Masking Tape	1"	
	OFF WHITE	Manco	Masking Tape	1 1/2"	
	WHITE	Johnson & Johnson	Cloth Tape	1"	
Sticky Side	WHITE	3M	Decorate/Repair	1 1/2"	
	WHITE	Manco	Duct Tape	2"	
	LT BROWN		Packing Tape	3"	
Sticky Side	DARK BROWN	Manco	Duct Tape	2"	
	DARK BROWN	American Tape	Packing Tape	2 3/4"	
	YELLOW	3M Scotch	Trans. Packing	2"	
	YELLOW	3M Scotch	Trans. Packing	2 3/4"	
	YELLOW	3M Scotch	Heavy Duty Tape	3"	
	RED	3M Scotch	Trans. Packing	2"	
	GREEN	3M Scotch	Heavy Duty Tape	1"	
	GREEN	3M Scotch	Trans. Packing	2"	
	BLUE	3M Scotch	Trans. Packing	2"	
	GRAY	3M Highland	Duct Tape	2"	
Gentian Violet	CLOUDY		Ordinary Scotch	3/4"	
	CLOUDY	3M Scotch	Ordinary Scotch	1"	
Sticky Side +PhotoFlo 100	WHITE	3M Scotch	Trans. Packing	2"	
	ORANGE	3M Scotch	Trans. Packing	2"	
	CLEAR		Packing Tape	2"	
	CLEAR w/ White Stripes		Strapping Tape	3/4"	
Titanium Dioxide	BLACK	3M Scotch	Heavy Duty Tape	2"	White Wetwop
	BLACK	3M	Decorate/Repair	1 ½"	
	BLACK		Vinyl Electrical	3/4"	

35.0 References

1. Bicknell, D. E.; Ramotowski, R. S. “Use of an Optimized 1,2-Indanedione Process for the Development of Latent Prints”. Journal of Forensic Science 2008, 53 (5), 1108–1116.

2. Cantu, A.A., Leben, D.A., Ramotowski, R., Kopera, J., Simms, J.R.,"Use of Acidified Hydrogen Peroxide to Remove Excess Gun Blue from Gun Blue-Treated Cartridge Cases and to Develop Latent Prints on Untreated Cartridge Cases", Jor. Forensic Sciences, Vol. 43, No. 2, pp. 294 – 298.

3. Chesapeake Bay Division-International Association for Identification processing brass cartridge cases with gun bluing. http://www.cbdiai.org/Reagents/bluing.html

4. Cummings, H., Hollars, M. L., and Trozzi, T. A., "Getting the Most from Cyanoacrylate Dyes", Journal of Forensic Identification 43, 37 (1993).

5. Fritz, P., van Bronswijk, W., Darren, F., Lewis, S., “Preliminary Investigations into a Commercial Thermal Fingerprint Developer for the Visualization of Latent Fingermarks on Paper Substrates”. Journal of Forensic Identification 64, 6 (2014).

6. Fritz, P., van Bronswijk, W., Patton, E., Lewis, S., “Variability in Visualization of Latent Fingermarks Developed with 1,2-Indanedione- Zinc Chloride”. Journal of Forensic Identification 63, 6 (2013).

7. Holder, E, Robinson, L., Laub, J, The Fingerprint Sourcebook, Washington, D.C., U.S. Dept. of Justice, Office of Justice Programs, National Institute of Justice, 2011.

8. Holt, D., “Determining the Quality and Sustainability of Friction Ridge Deposits on Envelopes Sent Through the Postal System”. Journal of Forensic Identification 63, 3 (2013).

9. John H. Olenik, IAI Seminar, 7/27 to 8/2/97. Danvers, Maine

10. Kent, Terry, ed. Fingerprint Development Techniques; Heanor Gate Publisher: Derbyshire, England, 1993.

11. Lee, Henry C. and Gaensslen, R. E., Advances in Fingerprint Technology, CRC Press, Inc., Florida, 1994.

12. Lennard, Christopher J.; Pierre, A. Margot. “Sequencing of Reagents for the Improved Visualization of Latent Fingerprints” Journal of Forensic Identification, September/October 1988, 38, 5, 197-210.

13. 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", Journal of Forensic Science 46, 241 (2001).

14. LIA Laser Safety Committee, Edited by David H. Sliney, Laser Safety Guide, Ninth Edition, Laser Institute of America, Orlando, 1993.

15. Lightning Powder Technical Note, Wetwop™ - Black- White

16. Lo, I. K. L., "A Review on Detection of Latent Prints on Self-Adhesive Tapes", Fingerprint Whorld, 19, 89 (1993).

17. Margot, Pierre and Lennard, Chris, Fingerprint Detection Techniques, 6th Edition, Institut de Police Scientifique et de Criminologie, Switzerland, 1994.

18. Masters, Nancy E. “Rhodamine 6G: Taming the Beast”; Journal of Forensic Identification, September/October 1990, 40, 5, 265-270.

19. McCarthy, Mary M. “Evaluation of Ardrox as a Luminescent Stain for Cyanoacrylate Processed Latent Impressions”; Journal of Forensic Identification, 1990, 40, 2, 75-80.

20. Menzel, E. Roland, Fingerprint Detection with Lasers, Second Edition, Marcel Dekker, Inc., New York, 1999.

21. Menzel, E. Roland. “A Guide to Laser Latent Fingerprint Development Procedures”; Identification News, September, 1983.

22. Menzel, E. Roland. “Detection of Latent Fingerprints by Laser-Excited Luminescence”; Analytical Chemistry, 1989, 61, 8, 557-561.

23. Menzel, E. Roland. Fingerprint Detection with Lasers; Marcel Dekker: New York, 1980.

24. Migron, Y.,Hocherman, G., Springer, E., Almog, J., and Mandler, D., "Visualization of Sebaceous Fingerprints on Fired Cartridge Cases: A Laboratory Study", J. Forensic Sciences, Vol. 43, No. 3, May 1998, pp. 543-548.

25. Mostowtt, T, Ramotowski, R.S., Morgan, J.P. Jr., “A Comparison of Thermal Fingerprint Development to Current Recommended Chemical Development Techniques on Porous Surfaces”, Journal of Forensic Identification 66, 4 (2016).

26. Murbarger, Melissa; Zaccagnini, Lisa. Substitute for Freon-Ardrox Formula. Illinois State Police Internal Publication, 1997.

27. Oden, S. and von Hofsten, B, "Detection of Fingerprints by the Ninhydrin Reaction", Nature, 173, 449 (1954).

28. Olsen, R. D., "Silver Nitrate Technique", in Scott's Fingerprint Mechanics, Springfield, Illinois:Charles C. Thomas, page 291.

29. Patton, E.; Brown, D.; Lewis, S. “Detection of Latent Fingermarks on Thermal Printer Paper by Dry Contact with 1,2-indanedione”. Analytical Methods 2010, 2 (6), 631–637.

30. Personal communication, Anna Zadow, Senior Fingerprint Specialist, DEA South East Laboratory, May 4, 2009.

31. Petruncio, A. V., "A Comparative Study for the Evaluation of Two Solvents for Use in Ninhydrin Processing of Latent Print Evidence", Journal of Forensic Identification, 50, 462 (2000).

32. Phillips, C. E., Cole, D. O., and Jones, G. W., Physical Developer: A Practical and Productive Latent Print Developer", Journal of Forensic Identification, 40, 135 (1990).

33. Pleckaitis, John; Developing Friction Ridge Detail on the Interior of Latex and Nitrile Gloves, Journal of Forensic Identification, 2007, 57(2), 230-239.

34. Pounds, C. A., Allman, D. S. and Wild, F. M., "The Development of Latent Fingerprints Using an Iodine Spray Technique", CRSE Report No. 746 (1992).

35. Pounds, C. A., Grigg, R. and Mongkolaussavaratana, T., "The Use of 1,8-Diazafluoren-9-one (DFO) for the Fluorescent Detection of Latent Fingerprints on Paper: A Preliminary Evaluation", Journal of Forensic Sciences, 35, 169 (1990).

36. Salama, J.; Aumeer-Donovan, S.; Lennard, C.; Roux, C. Evaluation of the Fingermark Reagent Oil Red O as a Possible Replacement for Physical Developer, Journal of Forensic Identification 58, 2 (2008).

37. Sneddon, N., "Black Powder Method to Process Duct Tape", Journal of Forensic Identification", 49, 347 (1999).

38. Sodhi, G. S. and Kaur, J., "Powder Method for Detecting Latent Fingerprints: A Review", Forensic Science International, 120, 172 (2001).

39. Technical Note, Journal of Forensic Identification 52 (5,2002/551).

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

41. Vachori, G.; Sorel, J. “New Fingerprint Development Process, in Proceedings of the International Forensic Symposium on Latent Prints”; U.S. Department of Justice: U.S. Government Printing Office, 1987.

END OF DOCUMENT