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Latent Print Detail
Technical Manual
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NOTE: Hyperlinks were accurate at the time of manual publication.
1.0 Title: Scope

The Latent Print Detail (LPD) Technical Manual defines the technical procedures for examining friction ridge impressions, AFIS screening of latent prints, development and recovery of latent prints from evidence, and digital enhancement.

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This manual is not designed to be an all-inclusive collection of every possible procedure or variation of procedure which might be used in the recovery and examination of friction ridge impressions. It is expected that deviations in methodology will occur at the discretion of the individual analyst as set forth in the LVMPD Forensic Laboratory Quality Manual. Due to the wide variety of evidence received by the analyst, a great deal of ingenuity is required in the analytical approach. This may require the modification of a technique or the search for a new one in order to accomplish the task of thorough evidence examination. The procedures presented in this manual are intended to provide a sound framework upon which to build.

Uncertainty of measurement does not apply to the Latent Print Detail due to the significant qualitative aspects of the method.
2.0 Title: References

2.0 References

LVMPD Forensic Laboratory Quality Manual
LVMPD Forensic Laboratory Safety Manual
LVMPD Department Manual
ISO/IEC 17025: 2017(E)
ANAB Forensic AR 3125
LVMPD FORENSIC LABORATORY
TECHNICAL PROCEDURES
LATENT PRINT DETAIL

3.0 Title: Terms and Definitions

3.0 Terms and Definitions

ACE – Active Control of Evidence. This is the software system for cataloging and tracking chain of custody for items of evidence. Evidence may be located in the database by LVMPD event number or ACE number (AC#).

AFIS – Automated Fingerprint Identification System. A database that stores fingerprints and palm prints of arrestees and certain civilians. Latent prints recovered from crime scenes can be searched through AFIS databases in an attempt to identify subjects on the scene. Latent prints must meet “AFIS Quality” criteria in order to be searched through the databases.

Analysis – Assessment of a friction ridge impression to determine suitability for recovery or comparison.

Anatomical region – Area of the hand or foot (hypothenar, left palm, medial phalanx, right index finger, etc.).

Cannot (Could not) Exclude – The documented conclusion when there is detail in agreement between a friction ridge impression and an exemplar print; however, the agreement is not sufficient to conclusively identify the source due to the quality or quantity of detail in the friction ridge impression.

Comparison – Assessment of the relationship between the data in two friction ridge impressions to determine whether or not the impressions originated from the same source.

Distal phalanx – (pl. distal phalanges) The end segment (furthest from the palm) of a finger or thumb. This segment of the finger or thumb is recorded on a typical fingerprint card.

Evaluation – Determination of whether or not two friction ridge impressions originated from the same source.

Exclusion – The conclusion that a friction ridge impression was not made by a particular source.

Exemplar prints – Controlled recording of the friction ridge skin of a specific individual; also referred to as known prints or reference standards.

Focal point – A gross feature in the friction ridge skin that assists in orientation of a print or guides the selection of search parameters during comparison. Focal points may be the core of a pattern, a delta, a crease, a scar, or other gross feature.
Hypotenar – The ulnar side of the palm below the distal transverse crease.

Inconclusive – The documented conclusion when the analyst cannot determine whether or not there is detail in agreement between two friction ridge impressions.

Incomplete – The documented conclusion when the comparison of a friction ridge impression to a set of exemplars cannot be completed due to inadequate exemplar prints.

Identification – The conclusion that two friction ridge impressions were made by the same source.

Insufficient ridge detail – An impression(s) of the friction ridge skin that does not contain sufficient data to support a reliable conclusion; also referred to as “no value” or “not suitable”.

Interdigital – The region of the palm distal to the ulnar side of the distal transverse crease and radial side of the proximal transverse crease.

Card Number – Designator assigned to latent lift cards and latent photographs associated with a case (e.g. L1, L2, Q1, Q2).

Latent print – An impression of the friction ridge skin recorded under accidental or uncontrolled circumstances. For this document, “latent print” also refers to a patent print (visible print) or plastic print (molded print). Inked prints on documents, such as checks and rental agreements, are not considered controlled and will fall under the umbrella of “latent print”.

Latent Designator – Designator assigned to each suitable latent print on a latent lift card or latent photograph (e.g. A, B, C)

LIMS Priority – A number assigned in the LIMS Unit Record Details indicating the case priority

LIMS Sequence – A number assigned in the LIMS Unit Record Details indicating the case status

Known prints – see exemplar prints.

Medial phalanx – (pl. medial phalanges) the middle segment of a finger.

Midpalmar region – Recessed center area of the palm.

No suitable latent prints – The reported result when submitted lift cards (or processed evidence) do not contain any latent prints with sufficient data to support reliable conclusions; also referred to as “not suitable for comparison”.

Not compared – The documented result if a subject does not have exemplar prints or the exemplar prints do not contain the anatomical region present in the latent print.

Phalanx – (pl. phalanges) Segment of a finger or thumb.

Proximal phalanx – (pl. proximal phalanges) The segment of a finger or thumb attached to the palm.

Remstar – Secured storage cabinet for latent prints in the Latent Print Detail.
**Selectivity/Specificity** – In reference to friction ridge detail, selectivity or specificity of the detail refers to the discriminating strength of the data available in the impression.

**Source** – The individual who deposited a friction ridge impression(s).

**Suitable (Suitability)** – The determination that there is adequate data (quantity and quality of detail) in a friction ridge impression for some further process such as: retention in the case, further analysis by a forensic scientist, comparison with exemplar prints, or searching in AFIS.

**Sufficient (Sufficiency)** – An indication of quantity and quality of agreement or disagreement of detail between a friction ridge impression and a set of exemplar prints.

**Target data** – Friction ridge detail in the latent print that has been selected for search in the exemplar prints; also referred to as a target group.

**Thenar** – The radial side of the palm circumscribed by the thenar crease.

**Verification** – The independent check of a conclusion by another qualified analyst.

**Writer’s palm** – The ulnar edge (“blade”) of the hypothenar and interdigital region of the palm that typically rests on a surface when a person is writing by hand.
4.0 Responsibilities

In addition to the responsibilities outlined in the LVMPD Forensic Laboratory Quality Manual, a Forensic Laboratory Technologist assigned to the Latent Print Detail is also responsible for:

- Determining suitability of latent prints for database searches and automated friction ridge matching
- Determining anatomical source and distal orientation of friction ridge impressions
- Encoding friction ridge impressions in multiple database software platforms; screening candidate lists returned from database searches
- Manually screening potential positive candidates against database quality impressions.
- Use of digital imaging software to enhance and document friction ridge impressions following approved forensic methods.
- Development and recovery of latent prints from items of evidence.
- Case documentation and reporting

In addition to the responsibilities outlined in the LVMPD Forensic Laboratory Quality Manual, a Forensic Scientist Trainee/I/II assigned to the Latent Print Detail is also responsible for:

- Case management and triage
- Determining suitability of latent prints for manual comparison
- Comparison and evaluation of latent prints
- Determining suitability of latent prints for AFIS search
- AFIS encoding
- Screening of AFIS candidate lists
- Determining suitability of latent prints for recovery from items of evidence
- Development and recovery of latent prints from items of evidence
- Digital imaging procedures
- Technical case review
- Verifications
- Case documentation and reporting

In addition to the responsibilities outlined in the LVMPD Forensic Laboratory Quality Manual, the Forensic Laboratory Manager of the Latent Print Detail is technically responsible for the Latent Print Detail.
5.0 Title: Latent Print Examination Casework – Evidence Handling

All lift cards and photographs will be handled in accordance with the policies in the LVMPD Forensic Laboratory Quality Manual. All latent print packets will be inventoried prior to sealing. The inventory shall include a count of all packet contents (i.e. lift cards, photographs, diagrams, exemplars, etc.). The packet contents shall be checked against the ACE label and the latent print packet "Exemplars Submitted" table. In addition, the event number on the latent lift card or photograph label shall be checked against the event number on the latent lift packet. The inventory will be documented in the comments section of the chain of custody table. All latent lift cards, latent photographs, and exemplar prints in the latent print packet must bear the analyst’s initials.

During examination, only one case is open and active on the analyst’s desk or workbench at a time. While latent print evidence is in the process of examination, but not open and active on the analyst’s desk, it will be stored in a manner that prevents the loss or transfer of evidence from one package to another. Lifts cards or photographs will be stored inside the original latent print packet or other suitable secondary container when not being examined.

During case examination, latent lift cards and latent photographs may be stored unsealed in secured areas of the LPD workstations or in the REMSTAR. Latent print packets, latent lift cards, and latent print photographs have some unique handling and documentation requirements. These additional requirements are detailed below.

The analysis start date is the date the worksheet is started in LIMS. Worksheets will be started in LIMS the day the first item of evidence is opened, regardless of analysis type (e.g. AFIS, Comparison, Processing). If the analyst fails to start the worksheet on the same day as the first item of evidence was opened, the analyst will place a note in the case file and adjust the "Exams Started" field in the Details tab of the unit record.

The analysis end date documented on the report is the date the case is completed and submitted for Technical Review or Administrative Review if Technical Review is not required for the case type. If the review process causes the analyst to conduct additional examinations, the analysis end date will be adjusted to the date the case is resubmitted for technical or administrative review. Administrative or clerical changes to the case file do not change the analysis end date.
5.1 Evidence Marking

5.1.1 Latent Print Packet

The latent print packet is the “Item” in LIMS. The front of the packet will be marked with the following information:

- Impound package number (e.g. 1234/1 or 1234-1) Note: this impound package number is assigned by the analyst
- Lab Case Number
- Lab Item Number
- Card Numbers contained in packet (e.g. Q1-Q5)
- Initials of the analyst

If notations, beyond evidence markings, are made on the latent print packet, these notations must be initialed and dated.

5.1.2 Lift Cards/Photographs

A sequential card number will be assigned to all latent lift cards and latent photographs examined. Each latent lift card or latent photograph will bear a card number and the analyst’s initials. Card numbers for latent prints submitted by field personnel will be formatted Q# (e.g. Q1, Q2). Card numbers for latent prints generated by lab personnel will be formatted L# (e.g. L1, L2). This differentiation allows for rapid recognition of latent prints recovered in the laboratory versus those submitted from outside the laboratory. Card numbers must be documented for each lift card or photograph in the case notes and the report. If the submitting person has already assigned numbers to the lift cards and photographs, the analysts are encouraged to use these numbers.

If there are duplicate lifts or photographs of the same region(s) of ridge detail, the card number will include a sequential lower case letter. For instance, if there are three photographs of the same latent print, the photographs will be marked Q3a, Q3b, and Q3c. If the analyst assigned different card numbers (e.g. Q1 and Q15) to duplicate lifts or photographs of the same region of ridge detail, the card numbers will be cross-referenced in the case notes and report.

5.2 Latent Print Designators

Each latent print that is determined to be suitable for comparison will be assigned an uppercase letter, starting with “A” on each latent lift or photograph.

If there are duplicate lifts or photographs of the same latent print and only one of the photographs or lifts is needed for the examination, the latent print designator will be marked on the best lift or photograph. The analyst may choose to scan only the best lift or photograph into the notes; however, the notes must indicate the card numbers for the duplicates. For example, if there are four photographs of Q3, the analyst may choose to scan Q3b, but must indicate that Q3a, c, and d were also received.

If the analyst chooses to scan all of the duplicate lifts or photographs, the notes for the duplicate lifts or photographs will refer to the lift or photograph that is marked with the latent print.
designator. For example, if there are two lift cards of the same latent print, they would be marked Q1a and Q1b. If the best image is on Q1a, the latent print would be marked “A” on lift card Q1a and the notes for Q1a would reflect the examination results. The notes for Q1b would refer to Q1a for results.

If more than one photograph or lift of the same latent print is needed for the examination, each needed version of the latent print will be marked with the same uppercase letter. For example, if a latent print is photographed on a curved surface, it may take multiple photographs to capture all of the ridge detail. Each photograph would be marked with a card number: L1a, L1b, and L1c. If all three of these photographs were needed for the examination, the latent print in each photograph would be marked “A”. The notes will clearly indicate which images (e.g. L1a, L1b, and L1c) were needed to complete the examination.

In the case of a single lift card or photograph the latent print would be referenced in the notes using the lift designator and the latent designator (e.g. Q1A or L2B). In the case of multiple lift cards or photographs the latent can be referenced as Q1A or Q1aA.

The report can list the description for L1 as “three photographs from the side of the pistol” and the results would be “One suitable latent print marked A. A – John DOE was excluded.”

5.3 Chain of Custody

Latent print packets that are “active” can remain unsealed until completion of the case. Active cases are cases that are undergoing screening, case examination, or technical review.

Latent print packets must be “internally moved” in ACE to and from secured storage locations [Remstar (REMS), Archive (ARCV), or Latent Print Evidence Vault (VLT)] and will be “secure moved” between analysts.

If an analyst enters the latent print packet, the chain of custody will be signed upon release of the evidence to the next “location” (REMS, VLT, ARCV, or the analyst). Once the case is complete (through technical review as appropriate), the case analyst or reviewing analyst will seal the latent print packet and sign and date the chain of custody.

The case analyst and reviewing analyst will ensure the Lab Number has been added to the Invoice Data in ACE.

5.4 Comparison Case Notes

Comparison case notes are created in a LIMS worksheet, Word document, or both. If there are no suitable latent prints submitted in a case, there will only be a LIMS Comparison Worksheet. The case analyst will scan the front of the latent print packet(s) at 300ppi and save them to the Unit Record OR as JPG files. If comparisons were conducted to suitable latent prints, a Word document (Latent Print Lift Worksheet) is generated and the LIMS Comparison Worksheet and Exemplar Worksheet primarily serve a report-writing function. The latent print packet(s) are contained in the comparison worksheet and do not need to be scanned separately.
5.4.1 No suitable latent prints submitted – LIMS Comparison Worksheet

If none of the submitted latent prints are suitable for comparison, a short report can be issued from LIMS. In this circumstance, no Word document case notes are generated and the LIMS Comparison Worksheet serves as the case notes. Upon opening the Comparison Worksheet, there is a drop-down with the ACE numbers. Select the appropriate item to start the worksheet. The LIMS Comparison Worksheet is completed as follows:

**Header Information**

- **LAB#:** Auto-populates
- **Examiner:** Auto-populates
- **Technical Reviewer:** Select the name of the Technical Reviewer if appropriate
- **Event(s):** Auto-populates

**Outer Packaging Description**

- **Outer Package Type:** select “latent print packet” (or other packaging if appropriate)
- **Event #:** Auto-populates
- **Agency:** Auto-populates
- **Booking Officer:** Auto-populates
- **Date Booked:** Auto-populates, change to include the Lab Item Number in brackets or parenthesis, e.g. [Lab Item 1] or (Lab Item 1)

**Impound Package #:** This auto-populates from the Evidence Tab. The Evidence Tab is typically completed by the analyst prior to starting the Worksheet.

**Properly Sealed:** Indicate Yes, No, or Lab Created (radio buttons).

- Select “Lab Created” if the packet was generated by the LPD (e.g. processing case)
- If you select “No”, it prompts you for two fields:
  - Comments for improper seal
  - Resolution for improper seal

**Comments:** Generally not used for comparison cases

**Item Section**

- **WinACE #:** Auto-populates
- **Impound Item #:** Usually blank (may auto-populate if entered in ACE with an impound item#)
LAB Item #: Auto-populates

Description: Auto-populates, but can be edited in Evidence Exams under “Edit Custom Description”.

Not Analyzed: Check this box if the Lab Item was not examined for latent prints.

Item Notes: Generally not used for comparison cases

Item Serial #: Not used for comparison cases

Number of Lift Card/Photos: Leave blank

No Suitable Latent prints in Latent Print Packet: Click this check box

Changes to LIMS Worksheets are automatically tracked through versions of the worksheet; no additional documentation of changes is necessary.

5.4.2 Suitable Latent Print Submitted – Word Document Case Notes

If suitable latent prints are submitted on a case, the analyst creates a Latent Print Lift Worksheet in Word. This form is located in Qualtrax. It is a buildable form (using Quick Parts in Word) that contains basic case information and buildable components for images of latent print packets, lift cards, and latent print photographs. For each lift card and photograph component, there are dedicated spaces for the case analyst’s notes and a reviewing analyst’s verification documentation.

The header of the form contains fields for the lab case number (including unit record number) and the date the form was started. The footer contains fields for the case analyst’s identifier and page number.

The first page of the Latent Print Lift Worksheet contains a Comments section and an Exemplars section. There is also free space available that can be used for additional case notes.

The second page of the Latent Print Lift Worksheet is typically the Latent Print Packet page. After marking the latent print packet with the required case information (Lab Case#, Lab Item #, Card #’s, and Impound Package #), the front of the latent print packet is scanned as a jpg image (300 ppi) and placed in the Latent Print Packet component.

The following pages are built with lift card or photo components to suit the case (may also include additional packets and submitted exemplars). After marking the individual lift cards/photographs (analyst initials, card numbers, and latent print designators), the lift cards and photographs are scanned as jpg images (300 ppi) and placed in the appropriate component. If the latent print location information is not visible on the front of the lift card/photograph, the back can be scanned (showing the label) and placed in a component or the analyst can indicate the location information in the Notes field for the lift/photograph.

The Notes field will indicate the following where applicable: the latent print designators, any relevant analytical information, results of comparisons, and any relevant AFIS information.
The Verifications field is used for the reviewing analyst when appropriate.

For cases requiring verification or being passed to another analyst for case completion, the Latent Print Lift Worksheet will be printed. These case notes and all accompanying documents (e.g. exemplars, AFIS print outs) must have the Lab Case Number (including unit record number), analyst’s initials and page numbers. The total number of pages will be indicated on the first page by the reporting analyst. Any corrections to these printed case notes must follow the policy for corrections made to hard copy documentation in the Forensic Laboratory Quality Manual. Once the case is complete (but prior to Administrative Review), the case notes are scanned to pdf and saved in the Unit Record Object Repository.

If the case does not require verification or is not being passed to another analyst for technical review, the Latent Print Lift Worksheet will not be printed. It can be uploaded as a Word Document or pdf in the Unit Record Object Repository. If corrections need to be made and the case notes were uploaded as a Word Document, the notes can be checked out, corrected electronically, and replaced as a second version in LIMS. If corrections need to be made and the case notes were uploaded as a pdf, the notes must be printed, hand-corrected, scanned, and replaced as a second version.

5.4.3 Suitable Latent Prints Submitted – LIMS Comparison Worksheet and Exemplars Worksheet

If there are suitable latent prints and comparisons are conducted, two LIMS Worksheets must be completed in order to generate a report: Comparison Worksheet and Exemplars Worksheet. Upon opening the Comparison Worksheet, there is a drop-down with the ACE numbers. Select the appropriate item to start the worksheet.

Comparison Worksheet

Header Information

LAB#: Auto-populates

Examiner: Auto-populates

Technical Reviewer: Select the name of the Technical Reviewer if appropriate

Event(s): Auto-populates

Outer Packaging Description

Outer Package Type: select “latent print packet” (or other packaging if appropriate)

Event #: Auto-populates

Agency: Auto-populates

Booking Officer: Auto-populates

Date Booked: Auto-populates, may change to include the Lab Item Number in brackets or parenthesis, e.g. [Lab Item 1] or (Lab Item 1) as appropriate
Impound Package #: This auto-populates from the Evidence Tab. The Evidence Tab is typically completed by the analyst prior to starting the Worksheet.

Properly Sealed: Indicate Yes, No, or Lab Created (radio buttons).
- Select “Lab Created” if the packet was generated by the LPD (e.g. processing case)
- If you select “No”, it prompts you for two fields:
  - Comments for improper seal
  - Resolution for improper seal

Comments: Generally not used for comparison cases

Item Section

WinACE #: Select from a drop down

Impound Item #: Usually blank (may auto-populate if entered in ACE with an impound item#)

LAB Item #: Auto-populates

Description: Auto-populates, but can be edited in Evidence Exams under “Edit Custom Description”.

Not Analyzed: Generally not used for comparison cases

Item Notes: Generally not used for comparison cases

Item Serial #: Not used for comparison cases

Number of Lift Card/Photos: Indicate the number of lifts cards and latent photographs in the packet.

No Suitable Latent prints in Latent Print Packet: Do NOT click this check box

AFIS Limited Exam Disclaimer: Do NOT click this check box

All suitable identified: Click this check box if all suitable prints have been identified in the case.

Lift/Photo Section

Lift / Photo: Select Q for prints submitted from the field or L for prints recovered in the forensic laboratory

LAB Item #: Auto-generates a sequential card number when “Add Lift Card” is clicked (edit if necessary)

Description: Enter the lift card location information beginning with “One lift card from…” or “Two photographs from…” or as appropriate for the evidence.
**Number of Latent Prints marked of value for comparison:** Indicate the number of suitable prints on the lift card or photograph. If “0”, it will indicate “No suitable latent prints.” in red text. If you enter 1 or more, it will open one latent print entry section.

**Latent Print Section**

**Latent Print:** Auto-populates with a sequential latent print designator (e.g. Q1A)

**Name:** This is a drop-down from the POI tab in Lab Case Details. Any additional names or name formats have to be added to the POI in order to be present in the drop-down.

**Result:** Indicate the appropriate result:

- **ID = Identified**
  - If result is “ID”, indicate the anatomical region from drop down. If a foot, type information
- **EXC = Excluded**
- **Incomplete WDIA = Incomplete with detail in agreement**
  - A second field opens for the anatomical region
  - A third field opens – indicate the additional exemplars in the appropriate reporting language
- **Incomplete NDIA = Incomplete with no detail in agreement**
  - A second field opens – indicate the additional exemplars in the appropriate reporting language
- **Cannot EXC = Cannot Exclude**
  - A second field opens for the anatomical region
  - A third field opens for “Reason” – leave blank
- **Not Compared**
  - A second field opens – indicate the additional exemplars in the appropriate reporting language
- **Inconclusive**
  - A second field opens – leave blank
- **Screened Pos = Not used**
- **Screened Neg = Not used**
- **Type… = type a different result**

**Additional Reporting Statements:** If there is additional information needed on the report regarding that specific conclusion, enter it here. This may include an * indicating results previously reported.

**Notes:** Generally not used for comparison cases.

If AFIS was searched, click the “Insert AFIS” button and complete the following:

**AFIS searched:** Pos (positive - hit) Neg (negative – No hit)

**Reg:** Click this check box if the latent print was registered in AFIS.
If AFIS was searched with positive results, additional fields open for subject entry:

**Name:** This is a drop-down from the POI tab in Lab Case Details. Any additional names or name formats have to be added to the POI in order to be present in the drop-down.

**Result:** Indicate the appropriate result:

- ID = Identified
  - If result is “ID”, indicate the anatomical region from drop down. If a foot, type information
- Incomplete WDIA = Incomplete with detail in agreement
  - A second field opens for the anatomical region
  - A third field opens – indicate the additional exemplars in the appropriate reporting language
- Cannot EXC = Cannot Exclude
  - A second field opens for the anatomical region
  - A third field opens for “Reason” – leave blank
- Screened Pos = Not used
- Screened Neg = Not used
- Type… = type a different result

**Additional Reporting Statements:** If there is additional information needed on the report regarding that specific conclusion, enter it here. This may include an * indicating results previously reported.

**Exemplar Worksheet**

**Header Information**

**LAB#:** Auto-populates

**Examiner:** Auto-populates

**Technical Reviewer:** Auto-populates from Comparison Worksheet

**Event(s):** Auto-populates

**Exemplar Information**

**Subject Name:** This is a drop-down from the POI tab in Lab Case Details. Any additional names or name formats have to be added to the POI in order to be present in the drop-down.

- Alias auto-populates from the POI tab

**ID:** enter the ID# or DOB

**Source:** Select from drop-down or type
- If source is “in package”, a second field will open. Enter the impound package number and lab item number (e.g. 1234/1, Lab Item 1)
- If there are multiple sources for a subject, click “Add Source” to create additional fields

FP PP MCP: Select the appropriate check boxes

Date: Enter the relevant date of the exemplars (required field except when the source is “in package”)

Notes: Any additional information regarding the exemplars; this information does not transfer to the report

Changes to LIMS Worksheets are automatically tracked through versions of the worksheet; no additional documentation of changes is necessary.

5.5 Report

5.5.1 Lift Card Location Information

Lift card location information should be quoted directly from the lift card or photograph. Due to formatting and readability issues with lift card location information, this information may be accurately paraphrased in the report without quotes. Some location information, like vehicle information, can be summarized for a group of lift cards or photographs without repeating for each lift card or photograph. Included with the location information will be any lift numbers assigned by the submitting person.

For example, the report would indicate:

One lift card from “the exterior right rear door” (1)

5.5.2 All Suitable Prints Identified

If all suitable latent prints are identified in the case, the report will indicate:

“All suitable latent prints have been identified; no further comparisons are warranted.”

5.5.3 Supplemental Examinations/Case Re-examination

In the report, each conclusion that was confirmed or is being re-reported during the supplemental examination will have an asterisk at the end of the conclusion statement. Below the comparison table, there will be a statement following an asterisk that references the previous report. For example:

“*Results previously reported by FS Guenther P# 5891 on 05/08/2012”

5.5.4 Names and Aliases

Subject names and ID#s are submitted with requests to initiate comparisons. When the exemplars are retrieved (by ID#), sometimes a different primary name is listed on the exemplars.
The primary name on the exemplars will be used in the header, exemplar table, and results, opinions and interpretations. In the header and exemplar table, the name submitted on the request will be added as an alias.

Occasionally, multiple exemplars under one ID# contain different primary names. If one of the names (primary or alias) on one of the exemplars is the same as the name listed on the request, the primary name of this exemplar will be used as the name in the report. If the requested name is listed as an alias on the fingerprint record, the name listed on the request will be added as an alias.

If none of the names (primary or alias) on the exemplars match the request, check with the requestor to verify that the correct name and ID # was provided on the request.

The use of an alias is not needed for formatting or the use of a suffix, e.g., GARCIA-RODRIGUEZ vs GARCIA RODRIGUEZ or John SMITH vs John SMITH, Jr.

If the headers of the exemplars do not contain the subject’s name a printout or screen capture from SCOPE/III or appropriate database will be included in the notes.

Submitted exemplars listed in the report will referred to by the Impound Package Number and Lab Item Number, if one has been assigned.

5.5.5 Methodology Used and Date of Exam

Reports shall identify the methodology used. A general statement included at the end of the report such as “Unless otherwise specified, any latent prints listed above were analyzed utilizing the applicable components of the ACE-V method.” is sufficient. The starting and ending date of the examination process will be included in the report.

5.6 Release of Latent Print Packets

If a latent print packet has not been entered into ACE, it must be entered and bar-coded before removing from the laboratory.

If the court needs to retain latent print evidence, the courts will be advised to retain the entire latent print packet. A signed evidence receipt will be returned to the Evidence Technician.

5.7 Hazard Communication

Latent print packets containing biohazards (e.g. latent lifts contaminated with possible blood or post-mortem impressions containing biological contaminants) must be labeled with a “Biohazard” label.

5.8 Secondary Dissemination of Criminal History (Fingerprint and Palm Print Records)

If a member of the Latent Print Detail receives a request from another law enforcement agency for finger or palm prints, a Secondary Dissemination Log (form LVMPD 507) must be completed. If records have been disseminated, this form can be sent to the Terminal Agency Coordinator via email or Inter-Office mail at the beginning of the following month. Refer to the Secondary Dissemination Log for instructions and examples.
5.9 Unit Record Object Repository in LIMS – File Naming

The file name for any files uploaded into the Unit Record Object Repository will have the Unit Record Number appended to the Lab Case Number (e.g. “LP 16-01223.1” or “LP 16-01223-1”). The Latent Print Detail adds the Unit Record Number because the Object Repository files for all Unit Records pool into a combined list when completing discovery requests. The Latent Print Detail often has multiple Unit Records for a case; appending the Unit Record Number makes it clear which files belong to which Unit Record.
6.0 Title: Latent Print Examination Casework – Procedure and Documentation

6.0 Latent Print Examination Casework – Procedure and Documentation

ACE-V is the procedure for the examination of latent prints. ACE-V is an acronym for Analysis, Comparison, Evaluation, and Verification. Analysts must use their experience-based discretion during the examination process.

General case documentation will follow the policies and procedures in the LVMPD Forensic Laboratory Quality Manual.

6.1 Analysis

Analysis is the assessment of a latent print or a set of exemplar prints to determine suitability for comparison. Both the latent print and the exemplar prints undergo analysis. The data to be considered during the analysis may include:

- Overall shape of the latent print
- Anatomical region (phalanx, palm, foot, or toe)
- Potential orientations
- Rarity and specificity of ridge flows
- Rarity and specificity of ridge counts
- Shape, rarity and specificity of pattern regions
- Delta location
- Rarity and specificity of the shape of the delta
- Specificity of ridge lengths and sequences of ridge lengths
- Robustness of ridge path curvature and angles
- Specificity of location and type of minutia
- Robustness of minutia shapes
- Robustness of ridge and furrow widths
- Robustness of edge shapes and pore position
- Rarity and specificity of crease patterns and shapes
- Specificity of scar detail
- Presence and clarity of incipient ridges
- Presence and significance of temporary features (temporary damage or disease)
- Tolerance for within-source variability due to distortion (may be caused by condition of the skin, residue, deposition factors, surface, environment, post-deposition factors, development reagent, and preservation method)
• Potential for between source similarity

A latent print will be deemed “not suitable” for comparison if it lacks sufficient data to support any reliable conclusions. An unsuitable latent print will not be compared to any exemplar prints.

Exemplar prints may not be suitable, or may be only partially suitable, for comparison. This can occur when the capture or transmission of the prints has caused degradation. This can also occur when regions of the exemplars are unclear, incomplete, or not recorded.

6.1.1 Suitability for Comparison Guideline

At a minimum, a latent print will be determined to be suitable for comparison if it contains at least eight (8) discernible minutiae in a distal phalanx impression, ten (10) discernible minutiae in a proximal or medial phalanx impression, and twelve (12) discernible minutiae in a palm or foot impression. These are minutiae that are located during the analysis, prior to comparison. In addition, the latent print must meet one or more of the following criteria:

- Discernible distal orientation
- At least one focal point (e.g. core, delta, crease, scar)
- At least one region of robust and distinct target data

A latent print of unknown anatomical region and distal orientation will be marked suitable for comparison if it has at least 14 discernible minutiae and either a focal point or at least one region of robust and distinct target data.

“Discernible” is dependent upon the analyst. Not all analysts can see the same information, so the minutiae must be discernible to the case analyst. The discernible minutiae do not necessarily have to be contiguous if the analyst can explain the breaks in the ridge paths (e.g. “ridge shift consistent with a decrease in pressure and slight movement”).

Due to the extreme variability of latent prints, latent prints that do not meet the above-listed criteria may be marked suitable for comparison at the discretion of the case analyst. For instance, a latent fingerprint may lack eight minutiae, but may have other significant data (e.g. incipient detail, scar detail, or seven highly selective minutiae) or high clarity. This additional data will contribute to the determination of suitability for comparison. The analyst will document which data permitted the analyst to determine the latent print was suitable for comparison when a latent print does not meet the above-listed criteria.

The above listed criteria are based on the combined experience of the Latent Print Detail and are a quality assurance standard adopted to help mitigate errors and provide a minimum standard with which to evaluate the analysts’ determination of suitability for comparison.

6.1.2 Marking Latent Prints on Lift Cards and Photographs

Those latent prints determined to be suitable for comparison will enter the comparison process. These suitable latent prints will be assigned a latent print designator (see section 5.2) and will be marked, whenever possible, with a symbol. The symbol documents the possible anatomical region and the orientation of the print, thus documenting how the print was searched. Overlaid prints may inhibit the ability to mark a latent print with a symbol, so this information must be
documented another way (e.g. written notes or on an annotated copy of the latent print). Symbols to be used for marking latent prints are:

- Arch placed over the distal end of a distal phalanx impression.
- Single bracket placed at the proximal end of a palm or foot impression.
- Bracket along each side of a proximal or medial phalanx impression.
- Circle around a print of unknown anatomical region. This indicates all available regions of the exemplar prints were searched in multiple orientations.
- A question mark can be placed next to a symbol when the analyst has determined the probable anatomical region but is unsure of the orientation. This indicates the analyst searched in the specified anatomical region, but in more than one orientation. Multiple orientation markings may also be used to indicate search orientations.

If an analyst marks the print with a symbol, but determines that the symbol needs to be corrected, the analyst will strike-through and initial the incorrect symbol and annotate the latent print with the correct symbol or orientation.

If a latent print contains more than one anatomical region, each area that contains detail of value for comparison will be marked with a symbol; however, only one latent print designator will be assigned. For instance, if the entire length of a finger is recorded in the latent print, an arch will be placed over the distal phalanx and brackets placed along the medial and proximal phalanges. This entire impression will be designated “A”.

If there is connective ambiguity between areas of ridge detail (the analyst cannot determine if the two regions are part of the same touch), each region that is suitable for comparison will be marked and assigned a latent print designator.

6.1.3 Documentation of Analysis

The case notes will reflect the result of the analysis of each lift card or photograph and will include the latent print designators and anatomical regions.

If a latent print is compared, it must be marked suitable for comparison and all conclusions recorded in the notes.

If, during comparison, the analyst determines that the latent print is not suitable for comparison and halts the comparison process, the notes must reflect that comparisons were attempted and the reason for determining the print is not suitable for comparison (e.g. specificity of ridge detail too low to render reliable conclusions).

If a latent print is marked as “suitable” after the comparison process has started, the notes must reflect the reason for updating the suitability decision.

6.2 Comparisons

Comparison is the assessment of the relationship between the data in a latent print and the data in a set of exemplar prints to determine whether or not the latent print and the exemplar prints share similarities.
6.2.1 Exemplar Prints

Exemplar prints are a known recording of an individual’s friction ridge skin. If fingerprints are the only exemplars necessary for a comparison, then only the fingerprint or 10-print card will be retained. If palm prints are needed for a comparison, finger and palm print records must be requested and retained if available.

Local exemplar prints are typically obtained from the LVMPD Archive or are submitted with the latent prints by field personnel. Juvenile fingerprint records can be requested from the Nevada Department of Public Safety state repository. Fax requests for juvenile prints to 775-687-3282 with the following information: subject’s name, subject’s date of birth, and agency case number under examination (e.g. LVMPD Event Number). In the body of the fax, request that the prints be faxed to the forensic lab using the 600 ppi setting on the Nevada DPS fax machine. Call the main number (below) if the records need to be re-faxed.

Contact information for Nevada DPS is as follows:

Nicole “Nikki” Davis
Email ndavis@dps.state.nv.us
Phone 775-684-6227
Fax 775-687-3282
Main 775-684-6277

Contact information is located on the Latent Print Detail SharePoint Team site. Exemplars may also be obtained from North Las Vegas Police Department, Henderson Police Department, the Nevada State Repository, WIN members, California Department of Justice, and IAFIS/NGI.

Copies (or print-outs) of all exemplars used during the comparison will be maintained in the case notes. Exemplars in candidate lists generated by AFIS will not be retained.

The case analyst will compare available victim or witness exemplar prints when appropriate to the case. Comparisons to the victim or witnesses do not need to be specifically requested.

If exemplars are not available for the requested subjects, the case analyst will notify the manager and the manager will inform the requestor of the change to the request (per Forensic Laboratory Quality Manual). The subjects without available exemplars will not be listed on the report.

6.2.2 Comparison Process – Manual Searches

Comparison starts with the selection of target data in the latent print. Ideal target data is a region of robust and distinct detail that includes a focal point or is near a focal point. The exemplar prints are scanned to locate the target data. If the target data cannot be located, new target data may be selected or the same target data may be searched with different parameters (e.g. different orientation or increased tolerance for variation in appearance of the target data).

If, after exhaustive search, the target data cannot be located in the exemplars, the analyst formulates a conclusion.
If a region of similarity is encountered, the comparison region expands away from the target data (comparing more data) and the analyst formulates a conclusion. The conclusion is based upon the cumulative weight of the data.

6.3 Evaluation

Evaluation is the formulation of a conclusion based upon analysis and comparison of the latent print to a set of exemplar prints. The analyst considers the cumulative weight of the data in the impressions in order to render a conclusion.

The manual comparison process is often an iterative process; the analysts repeatedly searching through the exemplar prints using revised search parameters to converge on an accurate conclusion. This iterative process ends for a particular latent print when it is identified. The comparisons to any other subjects are discontinued and only the identification is noted and reported. If the manual process concludes without an identification – all conclusions to all subjects are recorded in the notes and reported.

The only case documentation exception is for AFIS. Conclusions to individuals manually compared prior to AFIS must be documented in the notes, regardless of whether or not an AFIS search results in an identification. If an AFIS search results in an identification, only the identification is reported for the latent print.

If detail is found in agreement between a latent print and an exemplar, the analyst will mark the latent print designator next to the area of the exemplar where the detail was found in agreement. If the exemplars are case specific (e.g. printed from database, victim exemplars, or major case prints), the latent print designator can be marked on the original exemplar. If the exemplars are not case specific (e.g. fingerprint card from Fingerprint Bureau, Special Print Card, or juvenile fingerprint card), the latent print designator will be marked on a copy of the exemplar.

See Appendix B for reporting verbiage examples for all conclusions.

6.3.1 Identification

Identification is the conclusion that a latent print and an exemplar print were made by the same source. The cumulative weight of the data in the latent print and exemplar print must be sufficient to: 1) support the conclusion that the impressions were made by the same source and 2) reduce the possibility that the impressions were left by different sources to the point it can be disregarded.

Once a latent print has been identified, comparisons to any other individuals will be discontinued.

For each comparison resulting in an identification, the notes will reflect the anatomical region(s) and the name (at least the last name) of the person identified. Annotated images documenting the basis for the identification are encouraged. If the identification is complex, annotated images are strongly recommended.
6.3.2 Exclusion

Exclusion is the conclusion that a latent print and a set of exemplar prints were made by different sources. The cumulative weight of the data in the latent print and the exemplar prints must be sufficient to support the conclusion that the impressions were made by different sources.

In order to render an exclusion, the analyst must ensure that all necessary anatomical regions are clearly recorded for comparison within the exemplar prints.

For each comparison resulting in an exclusion, the notes will reflect the name (at least the last name) of the person(s) excluded (e.g. “SMITH & JONES – excluded”).

6.3.3 Inconclusive

Inconclusive results occur when the analyst cannot determine whether or not there is detail in agreement between a latent print and a set of exemplar prints and the analyst has determined that additional exemplars will not permit a definitive conclusion. An inconclusive result may occur if the detail in the latent print is near or below the level of the “suitability” threshold.

For each comparison resulting in an inconclusive results, the notes will reflect the name (at least the last name), the reason for the inconclusive result, and the date of the conclusion. Annotated images of the analysis or comparisons will be documented (charted images).

6.3.4 Incomplete (due to exemplar prints)

An “incomplete” result will occur when the exemplar prints are inadequate (quantity or quality). The latent print may or may not have limited detail in agreement with the exemplar prints. Additional exemplars of the friction ridge skin will be required and may permit the analyst to reach a definitive conclusion.

For each comparison resulting in an incomplete result, the notes will reflect the name (at least the last name), whether or not any detail was found in agreement with the exemplars (include the anatomical region if detail was found in agreement), and the additional exemplars needed to complete the comparison. The detail found in agreement will be documented (charted images).

6.3.5 Cannot Exclude (due to latent print)

A “cannot exclude” result will occur when the latent print has detail in agreement with the exemplar prints; however, it is insufficient to identify the source due to the quality or quantity of the latent print. There is data to support the conclusion that the latent print and the exemplar print were made by the same source; however, the selectivity of the available corresponding data is not strong enough to disregard the possibility that another source could have left the print.

If an individual cannot be excluded from a latent print, the notes will reflect the name (at least the last name), the anatomical region(s), and the reason for the result (e.g. lack of quantity or quality in the latent print). The detail found in agreement will be documented (charted images).
6.3.6 Not Compared

If a latent print contains an anatomical region that is not recorded in the exemplar prints, or there are no exemplar prints, no comparisons are possible. For example, the latent print is a palm print and there are no palm exemplars available.

For each suitable latent print not compared, the notes will reflect the name (at least the last name) of those individuals not compared and the reason why (typically lack of exemplars).

6.3.7 Additional Exemplars

If an “incomplete” or “not compared” result may be resolved by a standard fingerprint or palm print record, the analyst will check SCOPE for other Clark County fingerprint or palm print records.

When the analyst researches the existence of exemplars, the research, the date, and the results of the research must be documented. For example, if SCOPE does not indicate any fingerprint records are on file for the other agencies, the analyst may note “1/15/2019 SCOPE searched – no fingerprint records available”. If SCOPE does indicate records are on file, the analyst may note “1/15/2019 SCOPE searched – fingerprints received from NLVPD”.

Analysts may also search III (Interstate Identification Index) for criminal history information from other states. If the subject has other state ID#s, those state repositories (or local agencies) can be contacted for any available exemplar prints.

If the analyst does not research the existence of exemplars from the other agencies, the analyst must document the reason why in the case notes (e.g. “extreme tip not recorded on standard fingerprint card” or “results needed immediately per requester”).

If the comparison to submitted victim exemplar prints or to submitted juvenile prints is “incomplete” or “not compared”, the analyst is not required to search for additional exemplars. These two instances are an exception due to the limited information provided or available for victims and juveniles.

See Appendix B for reporting language for requests for additional exemplar prints.

Exemplars in Case Record

If the case has suitable latent prints, the case record will have copies of any submitted exemplar prints and copies/print-outs of exemplars selected for comparison. If there are multiple records in Archive, the analyst may select the best records that contain the needed recordings of the skin.

Electronic exemplar prints requested/downloaded from NGI, Archive, or CA DOJ will stored in the LIMS Unit Record Object Repository as a png, tiff, psd, or bmp format. A printed hard copy will be included in the case notes. If the original file received is in a format other that those listed above (png, tiff, psd, or bmp) it will be noted in the case file.

6.4 Sciometrics LatentSleuth Software

LatentSleuth is a fingerprint analysis, visualization and matching tool designed to assist Latent Print Examiners in the analysis of latent prints against known subjects and victims. LatentSleuth
uses a method for latent-to-reference matching that fully leverages ridge skeletons, is rotationally independent, and effectively handles distortion caused by “elasticity of skin” and other factors. The end result is a mapping between the latent region of interest (ROI) to a region in each reference print being compared, which allows for comparisons based on a quantitative evaluation of the similarity of the latent and reference prints.

If LatentSleuth is used to assist in latent print searching or comparison it must be documented in the case notes.

6.4.1 The system may be used for fingerprints where the orientation is unknown or the initial comparison results in the conclusion of incomplete with no detail in agreement or exclusion for low to medium quality latent prints. Any conclusions rendered prior to using the system must be documented.

6.4.2 LatentSleuth is not currently validated for the medial/proximal phalanges or palm prints and may not be used for those types of latent prints.

6.4.3 When the system is utilized and results in a potential match; a copy of the edited latent print and candidate will be included in the case file. This may be printed or included as a digital screenshot.

6.5 Casework AFIS

If a latent print is searched through AFIS during casework, it must be documented in the case notes. The case notes must reflect which latent print(s) was searched, the date the AFIS search began, the database(s) searched (Local, CA-DOJ, WIN, NGI-MBIS, NGI-ULW), the result of each database search, and if registered in the local database. A latent print should meet the AFIS criteria in Appendix A to be registered in the local database. If a latent print is searched with negative results and NOT registered in the local database, the analyst will note the reason why the print was not registered in the case notes.

If latent prints were previously searched in AFIS with negative results more than six months prior to the case being worked, the case analyst will re-run the latent prints as a second inquiry or new search. The continual updates to the AFIS database make this a best practice. If a database search does not result in an identification, the result will be documented as “negative”. A negative AFIS result means that no matching print was located in the database; it does not mean that no matching print exists in the database. A negative AFIS search will not be verified. AFIS candidate lists will not be retained.

Conclusions to individuals manually compared prior to AFIS must be documented, regardless of whether or not an AFIS search results in an identification. If an AFIS search results in an identification, only the identification is reported for the latent print.

Reports must indicate an AFIS search was performed (positive or negative), the database(s) searched, and any latent print registrations.

See Section 7 for additional information regarding AFIS searches.
6.6 Consultations

Analysts are encouraged to consult other analysts during casework. If the analyst requires a significant consultation to reach a conclusion (i.e. in the evaluation phase), the consultation must be documented in the case notes. Significant consultations typically occur in two situations: 1) when an analyst finds a region of similarity and needs assistance interpreting the information in the latent print or exemplar print in order to render a conclusion or 2) the analyst cannot locate the latent print in the exemplars and needs assistance reaching threshold for an exclusion. The case notes must reflect who was consulted, the latent prints involved, the date of the consultation, the result of the consultation, and the handwritten initials of the analyst consulted. If the consultation results in an identification, the consulting analyst will not be used as the verifier for that identification. The consulting analyst will not be used as the technical reviewer unless authorized by the detail manager, or designee. In the event that the consulting analyst is not present when the worksheet is printed and the results of the examination are time sensitive, the detail manager, or designee may sign on behalf of the consulting analyst. When signing on behalf of the consulting analyst, the authorized person will verify the outcome with the consulting analyst by telephone or email and document the verification with a case communication record in LIMS.

Consultations during the analysis or comparison phase do not need to be documented. Examples of consultations that may occur during the analysis or comparison include: suitability for comparison, anatomical region, orientation, target group selection, variability in appearance, search parameters, and distortion interpretation.

6.7 Supplemental Requests/Case Re-examination

In some cases, there are limited comparisons of a subject(s) to the latent prints in the case. The most common occurrence is when a person is identified in AFIS and only compared to the AFIS quality prints (not compared to all the suitable prints).

6.7.1 Same subject requested for comparison

The investigating officer may request the comparison of the same subject to the remaining suitable latent prints in the case. If the same analyst receives the supplemental request, they will include the prior examination results, opinions, and interpretations in the supplemental notes. If a previously examined latent print resulted in an “incomplete” or “not compared” result and the needed exemplars are now available, only the new conclusion must be noted in the supplemental case file. It must be clear which conclusions are repeated from the original case and which conclusions are new (e.g. using an asterisk and a note for previously reported conclusions).

If a different analyst is assigned the supplemental request to compare the same subject, the supplemental analyst will re-examine the previously reported conclusions. It must be clear which conclusions are re-examined from the original case and which conclusions are new (e.g. using an asterisk and a note for previously reported conclusions).
6.7.2 Different subject requested for comparison

If the investigating officer submits a request to compare another subject(s) in the case, any previous subject(s) will be compared in so far as possible. If the supplemental request is assigned to a different analyst, previous conclusions will be re-examined. It must be clear which conclusions are re-examined from the original case and which conclusions are new (e.g. using an asterisk and a note for previously reported conclusions).

In this instance, because there is a deviation from the request, the analyst will email the detective and notify them that, in addition to the requested subject(s), the prior subject(s) will be compared to all possible suitable latent prints in the case.

If a different subject(s) is requested for comparison and all comparisons to prior subject(s) have been completed in so far as possible, the analyst may limit the comparisons to the new subject(s). The report will reference the existence of earlier reports.

See 5.5.3 for reporting.

6.8 Verifications, Review of Suitability, Technical Review, and Conflict Resolution

Once the case analyst has completed the case (case has been submitted for Technical Review or Administrative Review if Technical Review is not required for the case type), electronic notes and the printed case notes will be assembled and “closed”; any additional notations to printed notes must be made by hand, initialed, and dated. This is considered the end date of analysis. If, during the technical review process the case analyst performs additional comparisons, the “end date” must be changed on the report to the new date when the case was resubmitted for Technical Review or Administrative Review. Clerical and administrative corrections do not change the end date of analysis.

Verification is the independent check of a conclusion and must be performed prior to reporting (verbal or releasing report). Verifications must be performed for all conclusions: identification, incomplete, cannot exclude, inconclusive, and exclusion. If a print is identified, other conclusions to the print do not need to be verified. The determination of suitability for comparison may be reviewed during the verification or technical review process.

Exemplar to exemplar identifications, exemplar to exemplar exclusions, Convicted Offender/Registrant DNA sample record confirmations, and negative AFIS searches performed by a Forensic Scientist do not require verification or technical review.

For each lift card/photograph or latent print reviewed, the case notes must reflect the conclusion of the reviewing analyst, the date of the conclusion, and the reviewing analyst’s handwritten initials (or signature). Conclusions of the technical reviewer or verifier must be documented in the case notes as the conclusions are rendered. If the reviewing analyst concurs with the findings of the case analyst, the date and the handwritten initials are sufficient for each lift card or photograph reviewed.

If the reviewing analyst does not agree with the case analyst on a result, procedures established in the Forensic Laboratory Quality Manual must be followed. Additionally, the reviewing analyst must document their result in the case notes, technical communication worksheet, charted
images, or LIMS prior to discussing the results with the case analyst. The Technical Communication worksheet may be used to capture extended discussion regarding conclusions. This page will be scanned with the case notes or uploaded separately to the Unit Record Object Repository.

If the case analyst concurs with the reviewing analyst, the case analyst can simply document in the notes that they agree with the reviewing analyst and update the notes (the revised conclusion and the date). If a consultation is needed to determine the reported result, the date of the consultation and the result of the consultation will be documented in the case notes. If the case analyst and the reviewing analyst cannot reach consensus on the reported result, the lab manager will be notified.

If a clerical error has been made, the case analyst will correct the notes and LIMS worksheet as appropriate. If an erroneous identification is discovered in a case, the lab manager will be notified by the case analyst or the reviewing analyst. If a case undergoes technical review and changes are made to the notes or report as a result of administrative review, the case analyst will request a second technical review of the case file and continue administrative review in LIMS.

6.9 Limited Examinations

As appropriate, analysts may perform limited examinations of latent prints. A limited examination may mean that only selected latent prints are examined, that only certain individuals are compared, or both. The analyst will follow the above documentation procedures for those latent prints examined. The notes must reflect what evidence was not examined. The notes and report must clearly indicate that a limited examination was performed.

6.10 Digital Imaging for Documentation of ACE-V

If electronic images of latent prints or exemplar prints are used to document the analysis, comparison, evaluation, or verification of the prints, the images must be uploaded and approved in the Unit Record Object Repository in the LIMS. Documentation images of latent prints determined to be insufficient for comparisons do not need to be retained. The notes must reflect that documentation images were generated. At a minimum, a layered psd or tiff file of at least 1000 ppi will be uploaded and approved in the Unit Record Object Repository in the LIMS (e.g. Q1A_analysis.tif or Q2B_Chart.psd). A single file containing both the latent and the known print is sufficient. A lower resolution jpg image may also be saved in addition to the original documentation image.

6.11 Digital Image Processing to Assist ACE-V

If an analyst uses a computer and software as an enlarger (zooming into a print through Photoshop is like using a comparator or handheld magnifier) or lighting device (e.g. levels, brightness, or contrast adjustments in Photoshop that mimic desk lighting adjustments), these images do not need to be saved nor do the notes need to reflect that the computer and software was used during the examination.

If an analyst performs extensive digital imaging (beyond levels, brightness, or contrast) to determine that a print is suitable for comparison, this image must be uploaded and approved in
the Unit Record Object Repository in the LIMS (e.g. LP 15-12345-1 Q1_Di.psd). The notes must reflect that digital imaging was performed. This image is separate from the image used to document the analysis, comparison, evaluation or verification of the latent print.

This documentation is required for any analyst performing digital imaging work (case analyst, consulting analyst, verifier, or technical reviewer)

6.12 OnBase Images – Photographs from CSI

The Latent Print Detail often receives printed latent print photographs from the CSI Section. In some cases, the analyst may determine it is beneficial to review the digital images (stored in OnBase) during the examination process. The following procedures detail how to document the use of these electronic images.

6.12.1 No suitable latent prints on photograph submitted by CSI

If the digital image of a submitted photograph is viewed in OnBase (OB) or downloaded and viewed in Photoshop and the analyst determines the latent print(s) is not suitable, the notes will reflect that the image from OnBase was reviewed.

6.12.2 Suitable latent print(s) on photograph submitted by CSI

If the digital image of a submitted photograph is viewed in OnBase and the analyst determines the latent print(s) is suitable and the digital image is needed to perform comparisons, the digital image will be downloaded and renamed with the card # (same card number assigned to the photograph) and OnBase designator (e.g. Q1a_OB.psd). This downloaded image becomes the original image. A copy must be saved to perform any digital image processing including enhancement and calibration; this new image will be renamed with the card # and digital imaging designator (e.g. Q1a_Di.psd). The notes must reflect that the image was downloaded from OnBase and digital imaging was performed.

The notes will reference the file name so a reviewer can locate the image.

The OB and DI images and any subsequent documentation images must be uploaded and approved in the Unit Record Object Repository in the LIMS.
6.12.3 Error Corrections for CSI Photographs

If any images (raw file format) of latent prints from OnBase were not printed and submitted in a latent print packet, the packet will be returned to CSI for error correction.

If the printed photograph of a latent print is not a true and accurate reflection of the raw file latent print image in OnBase, the packet will be returned to CSI for error correction.

If a latent print image was printed by the Photo Lab from a jpg format, when the raw file format was available, the packet will be returned to CSI for error correction.

6.12.4 Retrieving images in OnBase prior to photographs being impounded by Crime Scene Analyst

If it is necessary to retrieve images from OnBase prior to a Latent Print Packet being impounded by a Crime Scene Analyst the notes will indicate the reason. This procedure will only be used during a major case protocol, priority 5-1 Administrative AFIS cases, or at the direction of the Latent Print Manager. A lab case may need to be created in LIMS by the analyst or LEST as you cannot generate a request in Property Connect prior to the evidence being booked in ACE. The start date of analysis would be the day the images were first accessed/downloaded from OnBase.

The notes will reflect the date the images were retrieved as well as the date the latent print packet was received.

Only verbal results will be released pending the submission of the Latent Print Packet. Once the Latent Print Packet is submitted the case will be completed in LIMS and the report issued.
7.0 Title: Administrative AFIS Screening

7.0 Administrative AFIS Screening

Lift cards, photographs, and evidentiary electronic images of latent prints are evidence. The electronic images of the latent prints in the AFIS database and any print-outs of the latent images from the database (e.g. verifications screens) are non-evidentiary examination documentation.

The Fingerprint Bureau of the LVMPD maintains control of the finger and palm records contained within the LVMPD AFIS database and the LVMPD Archive. The Forensic Laboratory maintains the Unsolved Latent File within the LVMPD AFIS.

The following procedures address the screening of latent print packets generated by field personnel for AFIS quality prints. General case documentation and evidence handling will follow the policies and procedures in the Forensic Laboratory Quality Manual.

Tenprint-Latent-Inquiry (TLI) policies, automatic ULF searches, and Convicted Offender/Registrant DNA sample record confirmations are also detailed in this section.

7.1 Case Triage – Selecting Cases to be Screened

The first stage of the triage process limits the cases by crime type. The following crimes are selected for continuation to the second stage of the triage process if there have been no arrests in the case: Robbery (407/407Z), Assault/Battery (415A/415B), Dead Body (419), Homicide (420/420Z), Shootings (non-officer involved shoots [OIS]), Sexual Assault (426/426Z), Kidnapping (427/427Z), and Burglary (406) where a firearm was stolen. Premier One (P1) will checked to see if any arrests have been made in the case.

The second stage of the triage determines the assigned detective or area command Investigative Sargent.

The third stage of the triage process applies to cases with the following crime types: Homicide, Attempt Homicide, Dead Body, and shootings (non-officer involved shootings). The primary assigned detective is emailed to determine if AFIS is needed to develop a lead in the case. These cases are not selected for AFIS Screening until a response has been received from the detective. If no response is received, AFIS screening will not be completed.

At any time, the Intelligence Liaison at CSI or a detective can request AFIS Screening for a case via laboratory request. Burglaries (406R/406C) are now accepted through the laboratory request process only and are no longer automatically screened.
7.2 Chain of Custody

See Sections 5.3.

7.3 AFIS Quality Prints

The lift cards and photographs will be screened for AFIS quality prints. The criteria for AFIS quality are detailed in Appendix A. Each AFIS quality latent print will be marked with a symbol (arch over the top of a finger and bracket at the base of a palm) and assigned a latent print designator (see section 5.2).

Latent palm prints often have multiple regions that can be searched in AFIS. The first region searched will be given the latent print designator as the "Latent No." (defined below for NEC IBW Software). Each subsequent region searched will be labeled with a sequential alphabetic "Latent No." starting with Z (for each lift card) and working backward through the alphabet. The notes will reflect what region is associated with which designator.

Case example:

Evidence No. (lift card number): Q001

Latent print designator: A
  Latent No. 1\textsuperscript{st} sub-region: A
  Latent No. 2\textsuperscript{nd} sub-region: Z
  Latent No. 3\textsuperscript{rd} sub-region: Y

Latent print designator: B
  Latent No. 1\textsuperscript{st} sub-region: B
  Latent No. 2\textsuperscript{nd} sub-region: X
  Latent No. 3\textsuperscript{rd} sub-region: W

Evidence No. (lift card number): Q002

Latent print designator: A
  Latent No. 1\textsuperscript{st} sub-region: A
  Latent No. 2\textsuperscript{nd} sub-region: Z

If there are duplicate lifts or photographs of the same AFIS quality latent print, only one copy will be marked with a latent print designator.

If there are multiple impressions of the same finger or palm within the same case, only one of the impressions must be marked with a latent print designator.

If there is a possible simultaneous impression on a lift card or photograph, the highest quality impression should be marked and searched first. If that search is positive, the remaining impressions within the simultaneous impression do not need to be marked or searched. If that search is negative, the remaining impressions will be marked and searched in order of AFIS quality.
While all lift cards and photographs will be assigned card numbers and initialed by the analyst, only those with designated AFIS quality prints will be scanned into the worksheet if the examination is limited to the AFIS quality. The notes will reflect if there are any remaining lift cards or latent prints that do not qualify as Administrative AFIS quality prints.

e.g. “Remaining lift cards/latent prints were not suitable for Administrative AFIS.”

7.4 Comparing Exemplars

If AFIS quality prints are compared to any exemplar prints, conclusions will be documented in the case notes and reported as indicated in Sections 5 and 6.

7.5 Latent Print Packet

No AFIS documentation is required on the latent print packet.

7.6 NEC IBW Data Entry Fields

7.6.1 LCMS “New Case Description” Information

The following “New Case Description” information will be entered into AFIS:

Case No.

The forensic lab case number, e.g. 15-12345

Case Name

The agency case number (LVMPD EV# or other agency case number) will be entered into this field for cross reference.

Incident Code and Statute of Limitations

The Incident Codes are in a drop-down box and include: Homicide; Rape and Sex Crimes; Robbery; Assault; Kidnapping; Burglary; Theft; Motor Vehicle Theft; Forgery; Drugs; Weapons; Escape; Arson; and Other Felonies and Misdemeanors. The statute of limitations for registered latent prints is based on the incident code and the Date of Crime (if the Date of Crime field is blank, it defaults to the date of entry). The analysts can manually set a different statute in the “Explicit Statute” field. Six months prior to the statute of limitations, the registered latent print will automatically search against the database (referred to as an automatic ULF search). Once the statute of limitations is reached, the case will auto-purge from the ULF. Homicide, Rape/Sex Crimes, and Kidnapping have no statute of limitations; all others are set for 4 years.

“Homicide” will be used for homicides, attempt homicides, and terrorism cases. If the case is a terrorism case, indicate this information in the Memo field.

Sexual assaults and attempt sexual assaults will be indicated as “Rape and Sex Crimes”.

Kidnapping and attempt kidnapping will be indicated as “Kidnapping.”
All robberies (robbery, attempt robbery, robbery with a deadly weapon, etc.) will be indicated as “Robbery”.

**Date of Crime**

The date of the incident is required. The date listed on the latent print packet will be used for LVMPD cases. For OJ cases, if the date is not clearly discernable from the request or from the evidence (e.g. date on lift cards or the date collected on an evidence package), the date the request was made (in LIMS) may be used as the Date of Crime.

### 7.6.2 LCMS “New Evidence” Information

#### New Evidence No.

This corresponds to the latent lift/photo **card number** (e.g. Q15 or L1). Since LCMS uses four characters, zeros will be used as place holders (e.g. Q015 or L001).

If a lift card must be scanned in two images for AFIS entry (i.e. the tape goes from the front of the card to the back) the first image (front of the lift card) will use Q002 and the second image (back of the lift card) will use B002. The notes in MBIS and the worksheet will reflect that the two images are linked to the same lift card. Alternatively the images may be combined using image processing software prior to uploading to AFIS.

#### New Evidence Type

In LCMS, there are “Context” images and “Source” images. The latent lifts cards and latent print photos are “Source” images.

The target resolution of latent print images will be 1000 ppi.

### 7.6.3 LCMS “New Latent” Information

#### Latent No.

This corresponds to the latent print designator (A, B, C, etc). Use the assigned latent print designator. If multiple regions of one latent palm print are searched separately, use letter designators from the end of the alphabet and document this information in the notes. For instance, if a palm print is marked “A” and there are two additional prints “B” and “C”, the additional parts of palm A would be searched as “Z”, “Y”, “X”. See Section 7.3 above for an example.

#### Latent Type

Select Finger or Palm as appropriate. If the incorrect type is selected delete the latent print and reselect the area as a new latent.

### 7.7 ULW Data Entry Fields

#### 7.7.1 Creating a New Case
Create Case

Select the type of search to be performed (LFFS or LFIS)

Case Prefix

Analyst’s initials or initials and P#

Case ID

Lab case number (e.g. 16-12345)

Priority

Options are high, routine, and low. Rush cases can be placed on high priority. All other cases can be placed on routine.

7.7.2 Open the Image

Latent prints staged for search will, at a minimum, be named with the card number and latent designator (e.g. Q1A). After staging, import the image into the case. This places the image in the queue for editing or immediate LFIS launch. ULW automatically appends the user prefix (initials), the case#, the latent#, the image file name, the image file format, the extension# (for multiple searches of the same latent print), and the transaction type (LFIS or LFFS). The output looks like, ESS_17-10247_1_Q21A_tif_3.LFFS

7.8 AFIS Searches and Registration

Typically, eligible fingerprints and palm prints will be searched through the local database and NGI. NGI will be searched using NEC MBIS or ULW software. The California Department of Justice (CA DOJ) database and the Western Identification (WIN) database are available for fingerprint (not palm print) searches. DOJ and WIN will only be searched if the case has extenuating circumstances provided by the requester or NGI is not available.

All available databases (Local, MBIS-NGI, ULW-NGI, WIN, DOJ, SBRV..) will be searched for any case involved in a Major Case Protocol.

AFIS database references for NEC IBW and FBI ULW are located in Qualtrax (LVMPD\Forensic Lab\Latent Prints).

The date the latent print was first encoded in each database, the result of each database searched (NGI ULW- Negative, Local – Positive), and registration status (for LVMPD database searches) will be documented in the case notes. If the AFIS searches are negative, the print will be registered in the LVMPD database. If the latent print is searched or registered in a limited manner (e.g. a specific finger), the notes will indicate the justification for the limited search or registration parameters. If a latent print is searched with negative results and NOT registered in the local database, the analyst will note the reason why the print was not registered in the case notes.
Enhancements to latent prints within AFIS software do not need to be recorded in the case notes. Latent prints with white ridges should be inverted prior to searching or registering the print.

AFIS verification screen is retained in the case file for AFIS “hits”. The lift card number and latent print designator must be present on the print out (either embedded in the screen or written on the print-out). Full AFIS candidate lists will not be retained in the case record. Printing the AFIS verification screen is accomplished using “Print Screen” from the “Menu” button in the IBW Software (or using a screen capture tool).

If a print hits in the local database, the subject’s exemplar prints can be found in the LVMPD Archive using the CS# (SCOPE ID#). If prints cannot be located in Archive, see information in Sections 6.2.1 and 6.3.7 for additional sources of exemplar prints.

7.9 AFIS Case Notes

AFIS case notes are created in a LIMS worksheet, Word document, or both. If there are no AFIS quality latent prints submitted in a case, there will only be a LIMS Comparison Worksheet and an AFIS Memo worksheet. These LIMS worksheets serve as the case notes and generate the report. In addition, for cases with no AFIS quality latent prints, the analyst will scan the front of the latent print packets at 300ppi and save them to the Unit Record OR as a JPG.

If AFIS was searched with negative results and no comparisons were conducted, a Word document (Latent Print Lift Worksheet) is generated. In addition to the Word document, a LIMS Comparison Worksheet will be created to generate the report.

If an AFIS search was positive or comparisons were conducted, a Word document is generated and the LIMS Comparison Worksheet and Exemplar Worksheet primarily serve a report-writing function.

7.9.1 No AFIS Quality – LIMS Worksheets

If there are no AFIS quality prints submitted in a case, a short report can be issued from LIMS. In this circumstance, no Word document case notes are generated and the LIMS Comparison Worksheet and AFIS Memo worksheet serve as the case notes. Upon opening the Comparison Worksheet, there is a drop-down with the ACE numbers. Select the appropriate item to start the worksheet. The LIMS worksheets are completed as follows:

**LIMS Comparison Worksheet**

**Header Information**

**LAB#:** Auto-populates

**Examiner:** Auto-populates

**Technical Reviewer:** Select the name of the Technical Reviewer if appropriate

**Event(s):** Auto-populates

**Outer Packaging Description**
**Outer Package Type:** select “latent print packet” (or other packaging if appropriate)

**Event #:** Auto-populates

**Agency:** Auto-populates

**Booking Officer:** Auto-populates

**Date Booked:** Change to include the Lab Item Number in brackets or parenthesis, e.g. [Lab Item 1] or (Lab Item 1)

**Impound Package #:** This auto-populates from the Evidence Tab. The Evidence Tab is typically completed by the analyst prior to starting the Worksheet.

**Properly Sealed:** Indicate Yes or No (radio buttons).

- If you select “No”, it prompts you for two fields:
  - Comments for improper seal
  - Resolution for improper seal

**Comments:** Generally not used for AFIS cases

**Item Section**

**WinACE #:** Auto-populates

**Impound Item #:** Usually blank (may auto-populate if entered in ACE with an impound item#)

**LAB Item #:** Auto-populates

**Description:** Auto-populates, but can be edited in Evidence Exams under “Edit Custom Description”.

**Not Analyzed:** Generally not used for AFIS cases

**Item Notes:** Generally not used for AFIS cases

**Item Serial #:** Not used for AFIS cases

**Number of Lift Card/Photos:** Not needed

**Lift/Photo Section**

**Lift / Photo:** Not needed

**LAB Item #:** Auto-populates

**LIMS AFIS Memo**

Select the first check box, "The submitted latent prints were not selected for AFIS search..."
Changes to LIMS Worksheets are automatically tracked through versions of the worksheet; no additional documentation of changes is necessary.

7.9.2 AFIS Searched with Negative Results

If AFIS was searched with negative results and no comparisons were conducted, a Word document (Latent Print Lift Worksheet) is generated. In addition to the Word document, a LIMS Comparison Worksheet will be created to generate the report. Upon opening the Comparison Worksheet, there is a drop-down with the ACE numbers. Select the appropriate item to start the worksheet. The LIMS worksheets are completed as follows:

**LIMS Comparison Worksheet**

**Header Information**

- **LAB#:** Auto-populates
- **Examiner:** Auto-populates
- **Technical Reviewer:** Select the name of the Technical Reviewer if appropriate
- **Event(s):** Auto-populates

**Outer Packaging Description**

- **Outer Package Type:** select “latent print packet” (or other packaging if appropriate)
- **Event #:** Auto-populates
- **Agency:** Auto-populates
- **Booking Officer:** Auto-populates
- **Date Booked:** Auto-populates, may change to include the Lab Item Number in brackets or parenthesis, e.g. [Lab Item 1] or (Lab Item 1) as appropriate
- **Impound Package #:** This auto-populates from the Evidence Tab. The Evidence Tab is typically completed by the analyst prior to starting the Worksheet.
- **Properly Sealed:** Indicate Yes or No (radio buttons).
  - If you select “No”, it prompts you for two fields:
    - Comments for improper seal
    - Resolution for improper seal
- **Comments:** Generally not used for AFIS cases

**Item Section**

- **WinACE #:** Auto-populates
Impound Item #: Usually blank (may auto-populate if entered in ACE with an impound item#)

LAB Item #: Auto-populates

Description: Auto-populates, but can be edited in Evidence Exams under “Edit Custom Description”.

Not Analyzed: Generally not used for AFIS cases

Item Notes: Generally not used for AFIS cases

Item Serial #: Not used for AFIS cases

Number of Lift Card/Photos: Not needed

Lift/Photo Section

Lift / Photo: Select Q for prints submitted from the field or L for prints recovered in the forensic laboratory

LAB Item #: Auto-generates a sequential card number when “Add Lift Card” is clicked (edit if necessary)

Description: Enter the lift card location information beginning with “One lift card from…” or “Two photographs from…” or as appropriate for the evidence.

Number of Latent Prints marked of value for comparison: Indicate the number of suitable prints on the lift card or photograph. If “0”, it will indicate “No suitable latent prints.” in red text. If you enter 1 or more, it will open one latent print entry section.

Latent Print Section

Latent Print: Auto-populates with a sequential latent print designator (e.g. Q1A)

Name: Not used

Result: Not used

Additional Reporting Statements: If there is additional information needed on the report regarding that specific conclusion, enter it here. This may include an * indicating results previously reported.

Notes: Generally not used for comparison cases.

If AFIS was searched, click the “Insert AFIS” button and complete the following:

AFIS searched: Pos (positive - hit) Neg (negative – No hit)

Reg: Click this check box if the latent print was registered in AFIS.
Changes to LIMS Worksheets are automatically tracked through versions of the worksheet; no additional documentation of changes is necessary.

**Latent Print Lift Worksheet (Word document)**

If AFIS quality latent prints are submitted on a case, the analyst creates a Latent Print Lift Worksheet in Word. This form is located in Qualtrax. It is a buildable form (using Quick Parts in Word) that contains basic case information and buildable components for images of latent print packets, lift cards, and latent print photographs. For each lift card and photograph component, there are dedicated spaces for the case analyst’s notes and a reviewing analyst’s verification documentation.

The header of the form contains fields for the lab case number (including unit record number) and the date the form was started. The footer contains fields for the case analyst’s identifier and page number.

The first page of the Latent Print Lift Worksheet contains a Comments section and an Exemplars section. There is also free space available that can be used for additional case notes.

The second page of the Latent Print Lift Worksheet is typically the Latent Print Packet page. After marking the latent print packet with the required case information (Lab Case#, Lab Item #, Card #’s, and Impound Package #), the front of the latent print packet is scanned as a jpg image (300 ppi) and placed in the Latent Print Packet component.

The following pages are built with lift card or photo components to suit the case. After marking the individual lift cards/photographs (analyst initials, card numbers, and latent print designators), the lift cards and photographs with AFIS quality latent prints are scanned as jpg images (300 ppi) and placed in the appropriate component. If the location information is not visible on the front of the lift card/photograph, the back can be scanned (showing the label) and placed in a component or the analyst can indicate the location information in the Notes field for the lift/photograph.

The Notes field will indicate the following: the latent print designators, any relevant analytical information, and information regarding AFIS searches.

If the case does not require verification or is not being passed to another analyst for case review, the Latent Print Lift Worksheet will not be printed. It can be uploaded as a Word Document or pdf in the Unit Record Object Repository. If corrections need to be made and the case notes were uploaded as a Word Document, the notes can be checked out, corrected electronically, and replaced as a second version in LIMS. If corrections need to be made and the case notes were uploaded as a pdf, the notes must be printed, hand-corrected, scanned, and replaced as a second version.

7.9.3 AFIS Searched with Positive Results

If an AFIS search was positive or comparisons were conducted, a Word document is generated and the LIMS Comparison Worksheet and Exemplar Worksheet primarily serve a report-writing function.

**Comparison Worksheet**
Header Information

LAB#: Auto-populates

Examiner: Auto-populates

Technical Reviewer: Select the name of the Technical Reviewer if appropriate

Event(s): Auto-populates

Outer Packaging Description

Outer Package Type: select “latent print packet” (or other packaging if appropriate)

Event #: Auto-populates

Agency: Auto-populates

Booking Officer: Auto-populates

Date Booked: Auto-populates, may change to include the Lab Item Number in brackets, e.g. [Lab Item 1] as appropriate.

Impound Package #: This auto-populates from the Evidence Tab. The Evidence Tab is typically completed by the analyst prior to starting the Worksheet.

Properly Sealed: Indicate Yes or No (radio buttons).

- If you select “No”, it prompts you for two fields:
  - Comments for improper seal
  - Resolution for improper seal

Comments: Generally not used for AFIS cases

Item Section

WinACE #: Select from a drop down

Impound Item #: Usually blank (may auto-populate if entered in ACE with an impound item#)

LAB Item #: Auto-populates

Description: Auto-populates, but can be edited in Evidence Exams under “Edit Custom Description”.

Not Analyzed: Generally not used for comparison cases

Item Notes: Generally not used for comparison cases

Item Serial #: Not used for comparison cases
Number of Lift Card/Photos: Indicate the number of lifts cards and latent photographs in the packet.

No Suitable Latent prints in Latent Print Packet: Do NOT click this check box

AFIS Limited Exam Disclaimer: Check this box if appropriate (not all suitable latent prints examined)

All suitable identified: Click this check box if all suitable prints have been identified in the case.

Lift/Photo Section

Lift / Photo: Select Q for prints submitted from the field or L for prints recovered in the forensic laboratory

LAB Item #: Auto-generates a sequential card number when “Add Lift Card” is clicked (edit if necessary)

Description: Enter the lift card location information beginning with “One lift card from…” or “Two photographs from…” or as appropriate for the evidence.

Number of Latent Prints marked of value for comparison: Indicate the number of suitable prints on the lift card or photograph. If “0”, it will indicate “No suitable latent prints.” in red text. If you enter 1 or more, it will open one latent print entry section

Latent Print Section

Latent Print: Auto-populates with a sequential latent print designator (e.g. Q1A)

Name: This is a drop-down from the POI tab in Lab Case Details. Any additional names or name formats have to be added to the POI in order to be present in the drop-down.

Result: Indicate the appropriate result:

- ID = Identified
  - If result is “ID”, indicate the anatomical region from drop down. If a foot, type information
- EXC = Excluded
- Incomplete WDIA = Incomplete with detail in agreement
  - A second field opens for the anatomical region
  - A third field opens – indicate the additional exemplars in the appropriate reporting language
- Incomplete NDIA = Incomplete with no detail in agreement
  - A second field opens – indicate the additional exemplars in the appropriate reporting language
- Cannot EXC = Cannot Exclude
  - A second field opens for the anatomical region
  - A third field opens for “Reason” – leave blank
- Not Compared
  - A second field opens – indicate the additional exemplars in the appropriate reporting language
- Inconclusive
  - A second field opens – leave blank
- Screened Pos = Not used
- Screened Neg = Not used
- Type… = type a different result

**Additional Reporting Statements:** If there is additional information needed on the report regarding that specific conclusion, enter it here. This may include an * indicating results previously reported.

**Notes:** Generally not used for comparison cases.

If AFIS was searched, click the “Insert AFIS” button and complete the following:

**AFIS searched:** Pos (positive - hit) Neg (negative – No hit)

**Reg:** Click this check box if the latent print was registered in AFIS.

If AFIS was searched with positive results, additional fields open for subject entry:

**Name:** This is a drop-down from the POI tab in Lab Case Details. Any additional names or name formats have to be added to the POI in order to be present in the drop-down.

**Result:** Indicate the appropriate result:

- **ID = Identified**
  - If result is “ID”, indicate the anatomical region from drop down. If a foot, type information
- **Incomplete WDIA = Incomplete with detail in agreement**
  - A second field opens for the anatomical region
  - A third field opens – indicate the additional exemplars in the appropriate reporting language
- **Cannot EXC = Cannot Exclude**
  - A second field opens for the anatomical region
  - A third field opens for “Reason” – leave blank
- **Screened Pos = Not used**
- **Screened Neg = Not used**
- **Type… = type a different result**

**Additional Reporting Statements:** If there is additional information needed on the report regarding that specific conclusion, enter it here. This may include an * indicating results previously reported.

**Exemplar Worksheet**

**Header Information**
LAB#: Auto-populates

Examiner: Auto-populates

Technical Reviewer: Auto-populates from Comparison Worksheet

Event(s): Auto-populates

**Exemplar Information**

**Subject Name:** This is a drop-down from the POI tab in Lab Case Details. Any additional names or name formats have to be added to the POI in order to be present in the drop-down.

- Alias auto-populates from the POI tab

**ID:** enter the ID# or DOB

**Source:** Select from drop-down or type

- If source is “in package”, a second field will open. Enter the impound package number and lab item number (e.g. 1234/1, Lab Item 1)
- If there are multiple sources for a subject, click “Add Source” to create additional fields

**FP PP MCP:** Select the appropriate check boxes

**Date:** Enter the relevant date of the exemplars (required field)

**Notes:** Any additional information regarding the exemplars; this information does not transfer to the report

Changes to LIMS Worksheets are automatically tracked through versions of the worksheet; no additional documentation of changes is necessary.

**Latent Print Lift Worksheet (Word document)**

If AFIS quality latent prints are submitted on a case, the analyst creates a Latent Print Lift Worksheet in Word. This form is located in Qualtrax. It is a buildable form (using Quick Parts in Word) that contains basic case information and buildable components for images of latent print packets, lift cards, and latent print photographs. For each lift card and photograph component, there are dedicated spaces for the case analyst’s notes and a reviewing analyst’s verification documentation.

The header of the form contains fields for the lab case number (including unit record number) and the date the form was started. The footer contains fields for the case analyst’s identifier and page number.

The first page of the Latent Print Lift Worksheet contains a Comments section and an Exemplars section. There is also free space available that can be used for additional case notes.
The second page of the Latent Print Lift Worksheet is typically the Latent Print Packet page. After marking the latent print packet with the required case information (Lab Case#, Lab Item #, Card #’s, and Impound Package #), the front of the latent print packet is scanned as a jpg image (300 ppi) and placed in the Latent Print Packet component.

The following pages are built with lift card or photo components to suit the case. After marking the individual lift cards/photographs (analyst initials, card numbers, and latent print designators), the lift cards and photographs with AFIS quality prints are scanned as jpg images (300 ppi) and placed in the appropriate component. If the location information is not visible on the front of the lift card/photograph, the back can be scanned (showing the label) and placed in a component or the analyst can indicate the location information in the Notes field for the lift/photograph.

The Notes field will indicate the following where applicable: the latent print designators, any relevant analytical information, results of comparisons, and any relevant AFIS information.

The Verifications field is used for the reviewing analyst when appropriate.

For cases requiring verification or being passed to another analyst for case completion, the Latent Print Lift Worksheet will be printed. These case notes and all accompanying documents (e.g. exemplars, AFIS print outs) must have the Lab Case Number (including unit record number), analyst’s initials and page numbers. The total number of pages will be indicated on the first page by the reporting analyst. Any corrections or additions to these printed case notes must follow the corrections to hard copy documentation policy in the Forensic Laboratory Quality Manual. Once the case is complete (but prior to Administrative Review), the case notes are scanned to pdf and saved in the Unit Record Object Repository.

If a case was passed to another analyst for case completion the report will indicate the extent of the work done by the previous analyst.

  e.g. "Forensic Laboratory Technologist Olivia Smith, P#18239, performed AFIS entry and screening on the above evidentiary item(s)."

7.10 AFIS Reports

Analysts may issue a summary report under the following circumstances:

1) There were no AFIS quality prints associated with the packet/case.
2) There were no suitable prints associated with the packet/case.

If a summary report is being issued for multiple packets for a case, all packets must be addressed in the report. Reporting examples are below.

No AFIS quality in any of the packets:

“The latent prints in package 6920-1 (Lab Item 1) and package 14791-1 (Lab Item 2) were screened for AFIS with the following results, opinions, and interpretations:

The latent print(s) were analyzed and do not qualify for AFIS entry.”
No suitable prints in any of the packets:

“The latent prints in package 6920-1 (Lab Item 1) and package 14791-1 (Lab Item 2) were not suitable for comparison; no further action is warranted.”

Cases that include exemplar comparisons, negative AFIS searches, or a hit in AFIS will require a detailed report. Reports with AFIS hits generated during Administrative AFIS (not casework AFIS) are sent to the assigned officer and area command Investigative Sgt., and the CSI Liaison (aciocsi@lvmpd.com). The CSI Liaison is added as a “Carbon Copy” requester in the “Officers” tab in LIMS.

7.11 Tenprint to Latent Inquiries (TLI)

If a detailed report is issued, the analyst will retrieve the latent print packet and compare the person(s) tentatively identified from the TLI to, at a minimum, any unidentified AFIS quality prints. Case notes and reporting will follow Sections 5 and 6. The report will have a statement similar to: “DOE was included for comparison as the result of his/her exemplar prints being added to the AFIS database and searched against the unsolved latent file of the AFIS.”

If the analyst issues a TLI summary report, the analyst will only perform a tentative on-screen comparison in AFIS (latent print packets will not be retrieved). All registered prints will be compared to the exemplars to see if additional prints can be tentatively attributed to the same subject. Any prints that can be tentatively attributed to the subject will be deleted from Unsolved Latent File in AFIS and the notes will indicate which prints were deleted. The TLI Verify-Hit Report (or the charting screen) and the exemplar prints of the potential matching candidate will be included in the case notes.

The TLI summary report will contain the subject’s name, ID number, the latent prints that they were tentatively attributed to, and reference the previous reports where the latent prints were searched and registered.

Example: Name - POND, Amy ID# - 5689123  Latent Print - Q17A

Please refer to report dated 6/23/2015 by FS K. Aoyama, P#8025 for more information

TLI reports are sent to the assigned officer, area command Investigative Sgt., and the CSI Liaison (aciocsi@lvmpd.com). If the case is a homicide include Homicide@lvmpd.com. The CSI Liaison, and Homicide are added as “Carbon Copy” requesters in the “Officers” tab in LIMS.

Subsequent lab requests to “confirm the hit”, “possible association”, or similar language will be treated as a limited exam. Only the latent prints that generated positive TLI’s will be compared unless the requestor specifically asks for all latent prints to be compared.

7.12 Automatic ULF Searches

The analyst assigned to the Administrative AFIS working group is responsible for checking automatic ULF search results. In the case that multiple analysts are assigned to the working
group, the detail manager or designee will designate a primary analyst to be responsible for checking automatic ULF searches.

Positive automatic ULF searches within six (6) months of the statute of limitations will be treated the same as a positive Administrative AFIS search and follow the same documentation (reference 7.9.3) and reporting procedure (reference 7.10). The latent print lift worksheet (Word Document) will include a note describing the extent of the comparisons conducted.

  e.g. "Comparisons are limited to the automatic LVMPD AFIS searches launched by the MBIS system on <Insert Date>(<Insert Latent Lift Designators>)."

Positive automatic ULF searches that have more than six (6) months till the statute of limitations or case where the latent print evidence is not available, will be treated as a Tenprint to Latent Inquiry (reference 7.11) and a summary report may be issued.

7.13 Deleting Identified Latent Prints from AFIS

Registered AFIS Latent Prints - Identified

Any registered prints that are identified (or positively associated via TLI hit) must be deleted from the AFIS database. If the case is beyond the statute of limitations, all registered latent prints for the case will be deleted from AFIS. The notes must reflect which latent prints were deleted (specific latent prints or all latent prints).

The following crime types do not have a statute of limitations: homicide, attempted homicide, sexual assault, kidnapping, and terrorism. All other cases will be assigned a four (4) year statute of limitations.

Registered AFIS Latent Prints – Not Identified

If registered latent prints are not identified and a case reaches statute of limitations or the latent print evidence has been destroyed, the case may be manually or auto-purged from the ULF in AFIS.

7.14 Convicted Offender/Registrant DNA Sample Record Confirmations

The Latent Print Detail receives Identity Check cards or Nevada DNA Database Collection Kits for fingerprint confirmation. These comparisons are made at the request of the LVMPD CODIS Administrator. The assigned analyst needs to compare the fingerprints on the Identity Check card or Nevada DNA Database Collection Kit to known fingerprint records (typically from the local or WIN Archive). The analyst does not need to generate case notes or a report. Additionally, verifications are not required for any conclusions generated. The subject’s name, subject’s ID#, the conclusion(s), the date, and the analyst’s initials are documented on the front of the Identity Check card or Nevada DNA Database Collection Kit and returned to the LVMPD CODIS Administrator.

If the fingerprints on the Identity Check card or Nevada DNA Database Collection Kit do not match the known fingerprint records or are not suitable for comparison the CODIS Administrator will be immediately notified.
7.15 **Subjects with Multiple Nevada State Identification Numbers**

It is possible for a subject to have multiple Nevada State Identification (SID) numbers. If a person has a Carry Concealed Weapon (CCW) permit, they will have a civil fingerprint record associated with a state SID “NV5#” where # represents a unique identifier. If the same person also has a criminal record, they will have a criminal fingerprint record associated with a different SID. You may hit the same person under different SIDs when searching the Western Identification Network (WIN).

7.16 **Subjects with Multiple UCN Identification Numbers**

It is possible that a subject may have multiple numbers UCN’s. This may happen due to unconsolidated records. If this occurs, contact CJIS at [latentsupport@leo.gov](mailto:latentsupport@leo.gov) to determine the correct UCN.

7.17 ** Expedited AFIS – Photographs in OnBase**

Certain events may have a disproportionate impact on public safety and warrant expedited examination. Under these circumstances, it may be impractical to wait for the CSI to impound photographs prior to AFIS examination. These cases may include a major case protocol, Priority 5-1 Administrative AFIS case, or at the discretion of the Latent Print Manager. The photographs will be retrieved from OnBase and handled per section 6.12 and 6.12.4

Any AFIS quality prints will be entered into the relevant databases following procedures in 7.6 and 7.7. The lift card number will use the letter ‘C’ in place of the normal ‘Q.’ The ‘C’ will designate that the photograph was entered into AFIS prior to assigning a ‘Q’ or ‘L’ number to the impounded evidence.

For example if the photograph has the designator LP5 within the photo it will be entered as “C005” for MBIS or “C5” for NGI.

The case notes will indicate the assigned lift number for AFIS. Once the impounded photographs have been submitted the assigned ‘Q’ number will be added to the memo field in MBIS.

Only verbal results will be released pending the submission of the Latent Print Packet. Once the Latent Print Packet is submitted the case will be completed in LIMS and the report issued.
# LVMPD FORENSIC LABORATORY
## TECHNICAL PROCEDURES
### LATENT PRINT DETAIL

## 8.0 Title: Documentation of Latent Print Development and Recovery

### 8.1 Evidence Handling

Evidence will be handled in accordance with the policies and procedures established in the LVMPD Forensic Laboratory Quality Manual. Evidence may be stored in the Latent Print Detail evidence vault. Inked print evidence may be stored in secured areas of the LPD workstations. General case documentation will follow the policies and procedures in the LVMPD Forensic Laboratory Quality Manual.

### 8.2 Sub-Item Designators

The analysts often receive multiple items impounded as one item, e.g. five (5) plastic bags that are all Lab Item 1. If latent prints are recovered from any of the items, each item with a documented latent print will be sub-designated.

For example, an analyst could receive eight (8) documents booked as Lab Item 4. Latent prints are recovered from two (2) of the documents, they would be sub-designated as follows:

- Lab Item 4A – One document - One latent print recovered
- Lab Item 4B – One document - One latent print recovered
- Lab Item 4C – Six (6) documents – No latent prints recovered

Item sub-designators will be documented in the “Item Notes” in the LIMS Development Worksheet or the Word Processing Worksheet and marked on the evidence and internal packaging per lab policy.

Items may also be sub-designated if multiple non-similar items were booked as the same item. For example a backpack containing cellphone, calculator, and pencil box that are all booked as Lab Item 1 could be sub-designated as follow:

- Lab Item 1A – backpack – not examined for latent prints (fabric)
- Lab Item 1B – cell phone – One latent print recovered
- Lab Item 1C – calculator – No latent prints recovered
- Lab Item 1D – pencil box – No latent prints recovered

For latent print processing, sub-item designators are based on the Lab Item Number.
8.3 **Chain of Custody**

Chain of custody on evidence packages will be completed per the LVMPD Forensic Laboratory Quality Manual and the LVMPD Department Manual.

8.4 **Lab-Generated Latent Print Packets**

Latent print packets generated by a Forensic Scientist will be entered into ACE by an Evidence Technician or designee prior to Technical Review. The Forensic Scientist must stay with the latent print packet during ACE entry because the packet may be in an unsealed condition.

The front of any lab-generated latent print packet must be completed with:

- Agency (if not LVMPD)
- Event number (or case number)
- Code (incident 400 code or incident description)
- Impound Person’s name
- Impound Person’s P#
- Date (the date the case analyst prepared the packet)
- # Latent Prints (number of examination quality photographs and lifts)

After being booked into ACE, the packet must be added as evidence in LIMS. Additional packet documentation includes:

- Lab Case Number
- Lab Item Number
- Card Numbers contained in the packet
- Impound Package Number
- Initials of the analyst

For outside jurisdiction (OJ) evidence the impound package # will be the outside agency’s abbreviation (e.g. NLVP, HPD) assigned by the evidence technicians.

See Section 5.3 for additional Chain of Custody information regarding latent print packets.

8.5 **Relevant Dates**

The analysis start date is the date the worksheet is started in LIMS. Worksheets will be started in LIMS the day the first item is opened, regardless of analysis type (e.g. AFIS, Comparison, Processing).

The analysis end date documented on the report is the date the case is completed and submitted for Technical Review or Administrative Review if Technical Review is not required for the case type. If the review process causes the analyst to conduct additional examinations, the analysis end date will be adjusted to the date the case is resubmitted for Technical or Administrative Review. Administrative or clerical changes to the case file do not change the analysis end date.
8.6 Packaging

The analyst must indicate the package number assigned by the booking person (when available). The analyst must indicate the type of outer packaging and whether or not the package was sealed. If the package was not sealed, the analyst must indicate why unsealed evidence was being examined (e.g. “Delivered directly from CSI to avoid any evidence loss due to packaging.”). The analyst must indicate if seals were broken to enter a package (e.g. “Sealed box – broke seals to open.”). This information is captured in the LIMS Development Worksheet, in the Outer Packaging Description section or the Word Processing Worksheet “Package Description” section.

8.7 No Examination Conducted

If the analyst receives evidence in a case for latent print development and recovery, but does not perform any examination, it will be noted in the case notes. The case notes will indicate which requested items were not examined and the reason. If the analyst takes custody of the evidence, the chain of custody information must also be documented in the case notes and electronically in ACE. If the analyst enters the package of evidence, then the chain of custody on the package must be signed and dated upon re-sealing.

Latent print development and recovery will not be performed if:

- The evidence has not been properly packaged and stored for latent print recovery
- The evidence has already been subjected to latent print development techniques
- The evidence has been handled without gloves by other department personnel
- The evidence is in a condition that is not conducive to latent print development
- The evidence is a firearm or magazine (LVMPD 5/209.23, Sample Limitation for Forensic Analysis)
- The evidence is fired or unfired ammunition (LVMPD 5/209.23, Sample Limitation for Forensic Analysis)
- The evidence is balloons, small/tied plastic packets, contaminated surfaces (LVMPD 5/209.23, Sample Limitation for Forensic Analysis)
- The evidence is a wood handle (per validation completed in 2015)

Unless otherwise approved by the Latent Print Detail Manager or designee.

A report will be generated in LIMS.

8.8 Unit Record Object Repository in LIMS

The file name for any files uploaded into the Unit Record Object Repository will have the Unit Record Number appended to the Lab Case Number (e.g. “LP 16-01223.1”). The Latent Print Detail adds the Unit Record Number because the Object Repository files for all Unit Records pool into a combined list when completing discovery requests. The Latent Print Detail often has multiple Unit Records for a case; appending the Unit Record Number makes it clear which files belong to which Unit Record.

8.9 Development Notes and Reporting Language

8.9.1 Package Inventory
Packages of evidence often have multiple items, each with a unique Impound Item Number listed on the front of the package. Occasionally, a request is made for a subset of the items booked in the package. For instance, if Impound Package 9876/1 has Impound Items 1 through 5, it is possible that only Impound Items 2 and 3 were requested for latent print processing. The analyst will inventory the package and indicate in the notes that the package contained Impound Items 1 – 5, but only Impound Items 2 and 3 were examined (alternatively, that Impound Items 1, 4, and 5 were present but not requested for examination). The report will include a statement indicating what items of evidence were received but not examined.

If there is an error requiring correction to the package inventory, the Forensic Lab Evidence Vault Technicians will be notified and the analyst will make a note.

If a seal must be broken to enter a package of evidence (except latent print packets), the analyst will make a note.

The above notes will be made in the "Comments" field of the Outer Packaging Description section in the LIMS Development Worksheet or the "Package Description" section of the Word Processing Worksheet.

8.9.2 General Evidence Observations of Items

There are a number of general observations that are not directly related to latent print development and recovery, but may be relevant for the evidence in the case. If applicable, these notations will be captured in the "Item Notes" field on the Development Worksheet in LIMS or Item Description section of the Word Processing Worksheet.

Multiple Items Impounded Under One Item Number

It is possible that multiple items of evidence are impounded under one item number. Notations will be made regarding the inventory of the items booked as one item. If not all the pieces of evidence listed as one item are processed, notations will be made regarding which items were, or were not, processed for latent prints. Examples include:

- Lab Item 1 includes sunglasses and two cigarette butts – only the sunglasses were processed for prints per the request
- Lab Item 2 is a three drug packages; one drug package contaminated with residue and not processed per sample limits policy.

Internal Packaging

The analyst must indicate any internal packaging. Internal packaging does not refer to double-bagged outer packaging that is folded, stapled, and sealed together. Internal packing further segregates items inside a package. Examples include:

- Each bundle of plastic wrap packaged in a separate plastic bag
- Magazine packaged in a manila envelope
- Pistol inside another brown bag; laser in a plastic bag

Reconfiguration of Evidence
If the configuration of the evidence is changed by the analyst, this will be documented in the notes. Changes to the original configuration of the evidence may include:

- Removing drug evidence from packaging
- Removing cartridges from a magazine
- Removing tape from an item
- Removing the batteries from an electronic device
- Removing the grips from a firearm

**Repackaging and Added Internal Packaging**

If the analyst repackages the evidence, it will be documented. Any added internal packaging will be documented and properly marked. Examples include:

- “Tape removed from pistol was placed on acetate and repackaged in a manila envelope.” The manila envelope in this example would be marked with the Lab Case Number, Lab Item Number, analyst’s personal identifier, and “Lab repack”.
- “Repackaged blue pill in a plastic bag.” The plastic bag in this example would be marked with the Lab Case Number, Lab Item Number, analyst’s personal identifier, and “Lab repack”.

**Description of Sub-Itemization**

If sub-itemization is necessary for multiple items booked as one Impound Item Number, the sub-item designators and descriptions must be documented. See section 8.9.5 for examples.

**Drug Weights**

If drug evidence has been weighted by the analyst, it will be documented. See section 8.13 for additional information and examples.

**Consultations**

Consultations with analysts from other units regarding evidence recovery will be noted – who was consulted, the date of the consultation, and if any evidence was recovered. For example:

“Possible blood noted on the knife, consulted with FS T. Adams P#10072 – Adams swabbed possible blood and will book swabs separately”

**Examination by other Details**

If relevant, make any notations regarding previous examinations by other details in the laboratory. Examples include:

- FS T. Adams P# 10072 repackaged the magazine in a manila envelope
- FS R. Altizer P# 14757 repackaged each of the two fold over plastic bags and the meth in separate plastic bags
- Two glass jars with metal lids were previously examined by the Seized Drugs Detail. Jars were marked by K8702N with lab number, item number, and P#. Glue and black
electrical tape were removed from the large jar and repackaged by K8702N into a plastic bag. Glue was removed from the small jar and repackaged by K8702N into a plastic bag.

**Limited Examinations**

If there is a limited examination of the items, a description of the limitation and the reason will also be included in the case notes. Examples include:

- Cartridges not processed for latent prints per Laboratory Sample Limits Policy
- Small tied plastic bags not processed for latent prints due to the surface area and condition not being conducive to latent print recovery
- Outer plastic bag only processed for latent prints; inner plastic wrapping was coated in a viscous liquid and not suitable for latent print processing
- Outer packaging only processed for latent prints per requester
- Impound Item 2 also refers to ODV sheet – this is not evidence

Items that were received but not examined will be added to the report per the Forensic Lab Quality Manual.

**8.9.3 Initial Observations**

The initial observations contain further description of the evidence, particularly if the evidence has conditions that could prohibit latent print recovery. Examples include:

- Item is coated in dust
- Item has textured surfaces
- Item is coated in a residue

If applicable, these notations will be captured in the “Initial Observations” field on the Development Worksheet in LIMS or Word Processing Worksheet.

**8.9.4 Development and Recovery Notes**

If the item under examination is a single item, the notes are straightforward. For each development technique applied, the analyst must indicate the technique and the result of the technique for each item. Results are typically one of the following: 1) no visible ridge detail, 2) insufficient ridge detail, 3) no additional ridge detail developed, or 4) annotations regarding latent prints that were recovered.

If prints are photographed, re-photographed, or lifted, the card numbers (L1, L2, etc.) must be listed. The analyst must also note any significant location and orientation information regarding the latent prints (if not already documented). Location and orientation information can be documented through any combination of notes, sketches, and documentation photographs.

The Latent Print Detail often receives multiple items booked under the same item number. For instance, Item 1 may be a pistol and two magazines with cartridges. For each development technique applied, the analyst must indicate the technique and the result of the technique for each item and sub-item. See Section 8.9.5 for examples.
8.9.5 Results for Technique in LIMS Development Worksheet and Reported Results, Opinions, and Interpretations

The notes and reported results must cover all the items examined and reflect whether or not latent prints were recovered. If latent prints were recovered, the results will also indicate the lift card number (e.g. L1) for quick reference to the comparison table in the report.

Scenario 1 – Five bundles of plastic wrap from suspected cocaine – latent prints recovered

Result for Technique: "L1 photo’d on exterior plastic wrap of bundle marked 1A; L2 photo’d on the interior plastic bag from bundle marked 1B; IRD on three remaining bundles marked 1C”.

Reported Results, Opinions, and Interpretations: One latent print (L1) recovered from the exterior plastic wrap of the bundle of plastic wrap marked “1A”. One latent print (L2) recovered from the interior plastic bag of the bundle of plastic wrap marked “1B”. No latent prints were recovered from the other three bundles of plastic wrap (marked “1C”).

Note that the sub-item designations are detailed in the Item Notes in the LIMS Development Worksheet or Word Processing Worksheet. Example: “Five bundles of plastic wrap (Lab Item 1) sub-itemed as follows: 1A – one bundle; 1B – one bundle; 1C – three bundles”

Scenario 2 – Five bundles of plastic wrap from suspected cocaine – No latent prints recovered

Result for Technique: "IRD on five plastic wrap bundles."

Reported Results, Opinions, and Interpretations: No latent prints recovered.

8.9.6 Reporting Methodology Used

The report shall indicate which development techniques were used and the items subjected to the techniques. The statement shall be inserted after the latent print development results table.

Examples:

- “Lab Items 1, 3, and 7 were subjected to visual examination, cyanoacrylate fuming, and R6G dye staining. Lab Items 2 and 9 were subjected to visual examination and ninhydrin.”

If one Lab Item contains various items that use different techniques it is acceptable to combine them into one list.

- Lab Item 1 is a black plastic bag with a piece of duct tape. "Lab Item 1 was tested using visual examination, cyanoacrylate fuming, R6G dye staining, and Wetwop."
8.10 Latent Print and Documentation Photographs

Regardless of the type of image, the contents of each image must be clearly indicated. This can be accomplished in the case notes, in the electronic image name, or in a label in the photograph. Latent print photographs must also include the development technique.

Latent Print Photographs

All latent prints suitable for recovery must be documented and retained. The analyst will photograph the latent print after each successive development technique if the analyst determines that the technique revealed detail that will assist in the eventual examination of the latent prints.

For each development technique photographed, the analyst must retain the appropriate images that document the detail in the latent prints. It may be that one image of the technique fully captures the detail in a latent print, or it may be that multiple images are needed.

Latent prints will be photographed in the camera’s raw file format or scanned at a minimum of 1000 ppi. Latent print images must be saved as an original, untouched image. The original images from a digital camera are saved (without any digital processing) as a DNG or other raw file format. Original images from a scanner are saved (without any digital processing) as a PSD or uncompressed TIFF.

If the analyst needs to digitally process an image (calibration, enhancement, etc.), the original image must be duplicated and the digital processing performed on the duplicate image and saved as a PSD or TIFF. Whenever possible, digital processing should be performed in layers. There must be a logical link between the enhanced image and the original image (e.g. by file name).

At a minimum, one photograph of each latent print that is suitable for comparison must be printed and retained in a latent print packet generated by the analyst. The printed image must logically

<table>
<thead>
<tr>
<th>Method</th>
<th>Reporting Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual examination (VIS)</td>
<td>Visual examination</td>
</tr>
<tr>
<td>Cyanoacrylate Ester (CA)</td>
<td>Cyanoacrylate fuming</td>
</tr>
<tr>
<td>Rhodamine 6G (R6G)</td>
<td>R6G dye staining</td>
</tr>
<tr>
<td>1,2 Indanedione-Zinc (IND)</td>
<td>IND</td>
</tr>
<tr>
<td>1,8 Dianzo-fluoren-9-one (DFO)</td>
<td>DFO</td>
</tr>
<tr>
<td>Ninhydrin (NIN)</td>
<td>NIN</td>
</tr>
<tr>
<td>Oil Red O (ORO)</td>
<td>Oil Red O</td>
</tr>
<tr>
<td>Physical developer (PD)</td>
<td>Physical developer</td>
</tr>
<tr>
<td>Silver nitrate (SN)</td>
<td>Silver nitrate</td>
</tr>
<tr>
<td>Black powder (BP)</td>
<td>Black powder</td>
</tr>
<tr>
<td>Amido black (AB)</td>
<td>Amido black dye staining</td>
</tr>
<tr>
<td>Acid yellow 7 (AY7)</td>
<td>Acid yellow 7 dye staining</td>
</tr>
<tr>
<td>Crystal (Gentian) Violet</td>
<td>Crystal Violet dye staining</td>
</tr>
<tr>
<td>Wetwopt</td>
<td>Wetwopt</td>
</tr>
<tr>
<td>Reflected Ultra Violet Imaging system</td>
<td>RUVIS</td>
</tr>
</tbody>
</table>
link to its electronic image and must bear: agency case number, impound item number (or sub-item number), lab case number, lab item number, description of the item, pertinent location and orientation information, the development technique, general description of any digital imaging enhancements, and the personal marking of the analyst (typically handwritten initials). Do not include the unit record number on the canvas image.

The preferred format for latent print photographs is shown below. Printing photographs in portrait vs landscape will further distinguish photographs that were generated in the Latent Print Detail vs photographs generated by the Crime Scene Investigation Section.

Latent print images must be uploaded and approved in the Unit Record Object Repository in LIMS.

Latent print photographs that do not contain latents that are suitable for comparison do not need to be printed, but the images must be uploaded and approved in the Unit Record Object Repository in LIMS.

**Documentation Photographs**

Documentation photographs should be taken and saved in JPG format. If the documentation photographs are cropped or annotated the original and the edited version must be uploaded and approved in the Unit Record Object Repository in LIMS. The contents of the photograph must be
apparent. This may be done through annotation, information placards in the photograph or the file name and description.

8.11 Controls

Whenever a control print is used during latent print development (see section 9.06), the notes will reflect the name of the reagent, the lot number of the reagent, and the result of the control print. This information is captured in the Quality Control Section of the LIMS Development Worksheet.

8.12 Hazard Communication

Any evidence that has been processed for latent prints and bears any residue from the development technique will be labeled with a hazard sticker or marked “Chemically Processed”.

8.13 Drug Evidence: Best Weighing Practices

If drug evidence has not been analyzed by Controlled Substances, analysts in the Latent Print Detail will weigh the drug evidence, document the weight in the Item Notes in the LIMS Development Worksheet or the “Drug Weight Information” Quick Part in the Word Processing Worksheet, and report significant discrepancies to the manager of Controlled Substances. When drug evidence is weighed, the balance will be selected under Resources in LIMS.

Drug evidence items will be weighed with their original drug packaging to determine a gross weight. If the gross weight with the internal packaging is less than the listed weight, also weigh the evidence with the external packaging. Document both “gross” weights in the case notes and how the evidence was weighed (i.e. with what packaging).

Drug evidence more than 3100 grams can be weighed on a large balance in Seized Drugs.

If the weight is off by more than +/- 25% of the listed weight or there are missing or extra items (e.g. discrepancy in the number of baggies or the number of pills), send an email to the manager of Seized Drugs with the following information:

- Case number
- Item number
- Item description
- Booking officer name and P#
- Weight from evidence label
- Recorded weight in the laboratory

A Controlled Substance Analyst can be notified if the weight is off by less than +/- 25% at the discretion of the case analyst.

Make a notation in the case file that the manager of Seized Drugs was notified. If there is a missing or extra item, also notify an Evidence Technician.

Examples include:
- Lab Item 1 – Gross weight indicated on package as 566.7g; gross weight with plastic container on LP balance = 567.65g. Measured weight falls within +/- 25% of indicated weight.
- Lab Item 2 – Gross weight indicated on package as 645.3g; gross weight with plastic container on LP balance = 451.71g. Measured weight out of tolerance for +/- 25% indicated weight. FLM David Gouldthorpe notified via email.

8.14 LIMS Data Entry Fields – Development Worksheet

The following section summarizes information captured in the LIMS Development Worksheet for latent print processing. Cross reference to the Word Processing Worksheet are made as appropriate.

Header Information

Lab #: Auto-populates
Examiner: Auto-populates
Tech Reviewer: Select the name of the Technical Reviewer if appropriate (drop down)
Event(s): Auto-populates

The above information must be included in the LIMS Development Worksheet when the analyst is using the Word Processing Worksheet.

Resources

The Resources section tracks relevant chemicals, reagents, and equipment used in the case. Relevant chemicals include chemicals used for latent print recovery (e.g. cyanoacrylate or Wetwop) and Molecular Grade Water. Reagents include any reagent used for latent print recovery (e.g. R6G Working Solution or Indanedione-Zinc Working Solution).

If any of the following equipment is used, it must be selected in Resources:

- Foster + Freeman Cyanoacrylate chamber
- Misonix Cyanoacrylate Chamber
- Caron 6135 Environmental Chamber
- Caron 6105 Environmental Chamber
- Caron Condensate Recirculator (for the environmental chambers)
- Denver Instruments Balance (if drug weights performed)

The above information must be included in the LIMS Development Worksheet when the analyst is using the Word Processing Worksheet.
Quality Control Section

**Development Technique:** Type the development techniques used (this feeds the “Technique” field in the Item Section of the worksheet). Abbreviations are typically used for the various techniques (e.g. CA, R6G or IND)

- Note 1: RUVIS is indicated here even though it is a piece of equipment
- Note 2: Molecular Grade Water (MGW) is indicated here if DNA swabbing performed

**Lot #:** Indicate the lot number for any chemicals or reagents used in the case

- Note 3: RUVIS does not have a Lot# (leave blank)

**QC Result:** Indicate the QC result of any reagents used in the case (radio button)

- Note 4: Indicate “N/A” for RUVIS and Molecular Grade Water

The above information must be included in the LIMS Development Worksheet when the analyst is using the Word Processing Worksheet.

Outer Packaging Description

**Outer Package Type:** Indicate the type of outer packaging (list in a drop down; select “Other” for a text field if the type of packaging is not on the list)

**Event #:** Auto-populates

**Agency:** Auto-populates

**Booking Officer:** Auto-populates

**Date Booked:** Auto-populates

**Impound Package #:** Auto-populates

**Properly Sealed:** Indicate Yes or No (radio buttons).

- If you select “No”, it prompts you for two fields:
  - Comments for improper seal
  - Resolution for improper seal

**Comments:** If appropriate for the package of evidence, indicate the following:

- Seals broken to enter a package
- Inventory of package if it contains listed items that were not requested or examined
- Error corrections and notification of the Evidence Vault

Item Section

**WinACE #:** Select from a drop down
Impound Item #: Auto-populates

LAB Item #: Auto-populates

Description: Auto-populates, but can be edited in Evidence Exams under “Edit Custom Description”. This field will be edited to ensure a proper description of the evidence examined for latent prints. For instance, if the evidence auto-populates from ACE as “ODV + cocaine w/ pink sheet”, it will be edited to describe the item(s) actually processed for latent prints, e.g. “plastic packaging removed from suspected drugs”.

Not Analyzed: Check this box if the Lab Item was not examined for latent prints.

The above information must be included in the LIMS Development Worksheet when the analyst is using the Word Processing Worksheet.

Item Notes: This field will have general observations about the item that are not directly related to latent print recovery. Notations here may include:

- Inventory of multiple items impounded as one item
- Internal packaging of items
- Changes to the original configuration of the evidence
- Repackaging of items
- Description of sub-itemization
- Notes regarding DNA swabbing if performed
  - Separate Quick Part in Word Processing Worksheet
- Notes regarding drug weights if performed
  - Separate Quick Part in Word Processing Worksheet
- Consultations with analysts from other details regarding evidence recovery will be noted: who was consulted, the date of the consultation, and if any evidence was recovered.
- Indications of exams by other details
- Limited examination of the items: a description of the limitation and the reason will also be included in this field

Item Serial #: This field updates from ACE if it contains data; not required and can be edited.

Item Type: Not required; Drop down that can be edited

Context Specific Sub Item Info: Not required; text field

Initial Observations: This field will have relevant observations about the condition of the evidence. Relevant observations should include any condition that may inhibit latent print recovery. This field may also be used to provide a more detailed description of the evidence to be processed for latent prints.
Technique: Indicate the techniques used to recover latent prints from the Lab Item under examination. This information must be typed in the Quality Control Section before it can be used in this section.

Result: The result column has two fields: a drop down and additional notes. In the drop down there are three options: NVRD, IRD, and Photo… this result feeds the report. In the additional notes, indicate the following if relevant:

- result for each sub-item (if different)
- reason if a previously photographed latent print was not photographed under a subsequent technique (e.g. L1 not rephoto’d - no additional ridge detail developed)

The “Result” field in the Word Processing Worksheet is a single field that captures all the needed information.

NOTE: The Technique and Result fields in the LIMS Development Worksheet feed the results to the latent print report. If using the Word Latent Processing Worksheet, modifications must be made. In the Quality Control section of the LIMS Development Worksheet, include a “Development Technique” called “Final” (Lot # will be blank and QC Result will be N/A). Add “Final” as a Technique and select the appropriate drop down under “Result”. There is a default “Visual Exam” field in the LIMS Development Worksheet – leave the results blank.

8.15 Latent Prints Recovered

If latent prints of value for comparison were recovered, proceed to section 6.0 for the documentation of comparisons or AFIS searches as appropriate for the request.

8.16 Technical Review and Conflict Resolution

Technical Review will be performed for all latent print development and recovery cases. This section only pertains to the Technical Review of development and recovery. Refer to section 6.7 for the technical review of comparisons.

Once the case analyst has completed the case (submitted for Technical Review), any electronic notes will be uploaded to the OR and the case notes will be assembled and "closed" electronically; any additional notations may be made by hand, initialed, and dated or updated electronically. This is considered the end date of analysis. If, during the technical review process the case analyst changes their results or performs additional development or recovery of latent prints the end date is updated to the new date when the case was resubmitted to technical review. Clerical and administrative corrections do not change the end date of analysis.

The technical review procedure listed in the Forensic Laboratory Quality Manual will be followed. Conclusions of the technical reviewer must be documented using the LIMS technical review worksheet. The technical review will ensure that the proper method was selected for the evidence and that the procedures listed in 8.0 and 9.0 were followed. The determination of suitability for comparison may be reviewed during the technical review process.
If the reviewing analyst does not agree with the case analyst on a result, procedures established in the Forensic Laboratory Quality Manual must be followed. Additionally, the reviewing analyst must document their result in a technical communication worksheet or LIMS prior to discussing the results with the case analyst. The Technical Communication worksheet may be used to capture extended discussion regarding results. This page will be scanned with the case notes or uploaded separately to the Unit Record Object Repository.

If the case analyst concurs with the reviewing analyst, the case analyst can simply document in the notes that they agree with the reviewing analyst and update the notes (the revised conclusion and the date). If a consultation is needed to determine the reported result, the date of the consultation and the result of the consultation will be documented in the case notes. If the case analyst and the reviewing analyst cannot reach consensus on the reported result, the lab manager will be notified.

If an error has been made, the case analyst will correct the notes and LIMS worksheet as appropriate. If a case undergoes Technical Review and changes are made to the notes or report as a result of Administrative Review, the case analyst will request a second Technical Review of the case file and continue the Administrative Review in LIMS. If the review process causes the analyst to conduct additional examinations, the analysis end date will be adjusted to the date the case is resubmitted for Technical or Administrative Review. Administrative or clerical changes to the case file do not change the analysis end date.
9.0 Title: Development and Recovery of Latent Prints

9.0 Development and Recovery of Latent Prints

The chemical components of latent print residue allow an analyst to visually enhance friction ridge detail using chemical or physical processing. If the composition of latent print residue is thoroughly understood, it is possible to target specific residue constituents in order to visually develop friction ridge detail.

9.0.1 Latent Print Residue

Latent print residue is comprised primarily of secretions from the eccrine and sebaceous glands. The eccrine glands are present over the entire body but are most plentiful on the palms of the hands and soles of the feet. Eccrine secretions consist primarily of water however additional organic and inorganic constituents are present as well including chloride salts, alpha and beta amino acids, proteins, lipids, and lactate.

Sebaceous glands are not present on the palms of the hand or soles of the feet however secretions from the sebaceous glands, commonly known as sebum, are often found in latent print residue. Contamination resulting from frequent touching of body areas heavily populated with sebaceous glands like the scalp, forehead, or the back accounts for presence of sebum in the latent print residue. Sebum is a mixture of lipids including glycerides, fatty acids, wax esters, cholesterol and squalene.

It is important to note that the composition of latent print residue varies from person to person, and even from day to day within an individual. Studies have also shown that sebum composition can change with the age of the donor. Such variation must be taken into consideration when evaluating chemical processing results. Variations in the composition of donor test print residue may influence the QC check samples. Variations in both residue composition and surface interactions may result in a wide variety of processing results.

9.0.2 Solubility

Solubility is an important factor to consider when determining which chemical reagents to use in latent print processing. Compounds including amino acids, metal salts, and some proteins are soluble in water. In a situation where evidence comes into contact with water prior to fingerprint processing, it would be futile to spend time using amino acid targeting chemicals like Ninhydrin, DFO, or Indanedione. Instead, an analyst should directly target the non-water soluble components with Oil Red O and Physical Developer.
9.0.3 Equipment

If a cyanoacrylate chamber (CA) or environmental chamber (EC) is used to process evidence, the chamber will be indicated in the case notes (Resources in LIMS). For the environmental chambers, the humidifier will also be indicated in the notes (Resources in LIMS). The chamber codes in Resources are listed as follows:

- CA2 – Misonix CA-6000 (LVMPD 50572)
- CA3 – Foster + Freeman MVC 3000/D (LVMPD 19769)
- EC Large – Caron 6135 (LVMPD 10698)
- EC Small – Caron 6105 (LVMPD 10699)
- Humidifier – used for both environmental chambers

9.0.4 Reagents

Consumables used to prepare reagents must be inspected per Forensic Laboratory Quality Manual section 6.6. The Latent Print Detail does not have critical supplies as defined in Forensic Laboratory Quality Manual section 6.6.2; therefore, supplies do not require verification as defined in Forensic Laboratory Quality Manual section 6.6.2 c).

A reagent is a substance or compound used in a system to bring about a chemical reaction. Reagents used within the Latent Print Detail are prepared following procedures described in the Latent Print Detail Technical Manual. Reagents used within the Latent Print Detail are labeled following procedures described in the Forensic Laboratory Quality Manual (section 6.4). All reagents prepared specifically for use in the Latent Print Detail will be documented in the Reagent Log – Latent Prints and on the individual reagent preparation logs. Reagents are entered into the Resource Manager and the individual reagent preparation logs are uploaded in the Resource Manager Object Repository.

For chemicals that do not have an expiration date provided by the manufacturer (printed on the container or accompanying certificate of analysis), the expiration date will be listed as three years from the date the chemical was received. Chemicals will not be used beyond the manufacturers’ or lab-assigned expiration date. Labels will be used to annotate the date chemicals were received, opened, and the date the chemical expires.

The expiration dates of reagents in the Latent Print Detail are based on the date the reagents are prepared, not the expiration dates of any of the individual chemical components. This is acceptable for the Latent Print Detail because reagents are checked at the time the reagents are prepared and again at the time of use. Expiration dates for manufacturer prepared reagents are based on the manufacturers’ assigned expiration dates. If an expiration date is not assigned by the manufacturer (printed on the container or accompanying certificate of analysis), the expiration date will be listed as three years from the date the reagent was received. Reagents prepared by the lab have expiration dates as indicated in the preparation instructions.

Manufactured-prepared reagents (e.g. WetWop and powder) received without a lot number will be assigned a lot number upon receipt by the LPD. The lot number will contain the section code (LP), the date received, and the chemical number. For instance, if a container of powder was received on 2/14/11 and it was the first reagent received or prepared by the LPD on that day, the
lot number would be LP021411-1. Bottles should be dedicated for a specific reagent (e.g. a bottle used for storing ninhydrin should only be used for ninhydrin).

Disposal of chemicals and reagents will follow laboratory policies and procedures. Specific disposal instructions are detailed in the Latent Print Detail Technical Manual and Waste Logs.

9.0.5 Quality Control Check – Reagent Preparation Testing

A QC check sample will be analyzed at the time of reagent preparation to demonstrate acceptable performance of a given reagent. A reagent cannot be used for casework purposes until a positive QC check sample result is obtained. The QC check sample is created by depositing an appropriate control (i.e. skin residue test print or blood droplet/smear) on a test surface similar to the typical surfaces treated with the reagent (e.g. skin residue print on paper for ninhydrin). The QC check sample is then chemically processed using the appropriate processing procedure (see "Development and Recovery of Latent Prints" Section) and assessed. A positive QC check result is indicated by a color change or the development of a luminescent product and indicates a reaction between the control and the processing reagent (see table in 9.0.9 for QC checks for each reagent). Specific information regarding each chemical development technique can be found in the “Development and Recovery of Latent Prints” Section of the Latent Print Technical Manual and in the "Latent Print Development Technique Quality Controls" section.

9.0.6 Positive Control Samples – Casework Testing

A positive control sample is required each time a batch of evidence undergoes chemical processing for latent prints. A positive control is used to indicate a reaction between a processing chemical with its targeted residue component in a test print. A positive control is made by placing a skin residue print or blood droplet/smear onto a substrate (surface) similar in nature to the items of evidence being processed.

A positive result is generally indicated by a characteristic color change or the development of a product that is luminescent when viewed under the proper wavelength of light. Specific information regarding each chemical development technique can be found in later in this section. Positive Control test results must be documented in case notes per section 9.0.9 below.

9.0.7 Creating Controls

Blood controls can be made using whole blood stored (lavender tube) in the Latent Print Detail lab refrigerator (this blood expires three years from the draw and is tracked in the LIMS Resource Manager) or by the analyst drawing their own blood with a finger prick. A drop of whole blood from the tube will be placed on a slide using a pipette. If the analyst has pricked their finger, they can place a blood print on a clean glass slide.

Skin residue controls are created by the analyst rubbing their finger on a region of their own skin that contains sebaceous secretions and placing a print on the appropriate test surface. The analysts can use another donor for the test print.
9.0.8 Control Failures

**Quality Control Check Failure**

If the quality control check of a reagent fails, the analyst must determine if the reagent failed or the control failed.

If a blood control is being used, the analyst should make a second lot of the reagent (or select a different manufacturer’s lot) and test with the same blood control. If the new reagent reacts with the original blood control, the first reagent will be properly disposed. The reagent failure will be noted on the Reagent Preparation Log (if an analyst-prepared reagent) and in Resource Manager in the Comments section of the Resource Instance Details (e.g. “Reagent failed QC check; disposed.”) The reagent will also be archived in Resource Manager.

If the second reagent fails, a new whole blood tube will be obtained and placed into service. Both reagents will be tested with the new whole blood. If both reagents pass, the original whole blood will be properly disposed. The Comments section of the Resource Instance Details will be updated to reflect: “Blood failed QC check; disposed” and the blood will be archived in Resource Manager.

If a skin residue control print fails, two additional donors will be asked to leave skin residue test prints on the appropriate surface. If the reagent passes with the new control prints, it will be placed into service. The analyst will note the second round of testing on the Reagent Preparation Log. If the second round of quality control testing fails, the analyst will make a second lot of the reagent (or select a different manufacturer’s lot) and test with the same donors. If the new reagent reacts with the test prints, the first reagent will be properly disposed. The reagent failure will be noted on the Reagent Preparation Log (if an analyst-prepared reagent) and in Resource Manager in the Comments section of the Resource Instance Details (e.g. “Reagent failed QC check; disposed”). The reagent will also be archived in Resource Manager.

If there is any other outcome to the reagent and control testing, the Forensic Laboratory Manager will be notified and a plan of action determined.

**Positive Control Sample Failure**

If the positive control fails during evidence processing, but additional observations indicate that the processing reagent functioned properly, there is no need to reprocess the affected evidence. This can occur when the test print does not react to the reagent (due to the variability of latent print residue), but the evidence reacts normally (latent print development occurs). The analyst will document that the control failed, but the evidence reacted properly.

If the positive control fails during evidence processing and there is no indication that the reagent is functioning properly, the procedure above for “Quality Control Check Failure” will be followed to resolve the issue. If the control is found to be the failure, the evidence does not need to be reprocessed. If the reagent failed, the evidence will be reprocessed with the newly prepared (and positively QC’d) reagent. The notes will reflect the initial reagent QC failure and the new reagent information.
### 9.0.9 Reagent Control Check Table

<table>
<thead>
<tr>
<th>Technique</th>
<th>Control Method</th>
<th>Positive</th>
<th>Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2 Indanedione-Zinc (IND)</td>
<td>Amino acid test print on porous surface</td>
<td>Light pink visible print or luminescent print under laser</td>
<td>Reagent QC Lot (lot); Case Notes (use)</td>
</tr>
<tr>
<td>1,8 Diazafluoren-9-one (DFO)</td>
<td>Amino acid test print on porous surface</td>
<td>Light purple visible print or luminescent print under laser</td>
<td>Reagent QC Lot (lot); Case Notes (use)</td>
</tr>
<tr>
<td>Ninhydrin</td>
<td>Amino acid test print on porous surface</td>
<td>Purple visible print</td>
<td>Reagent QC Lot (lot); Case Notes (use)</td>
</tr>
<tr>
<td>Oil Red O</td>
<td>Sebaceous test print on porous surface</td>
<td>Red visible print</td>
<td>Reagent QC Lot (lot); Case Notes (use)</td>
</tr>
<tr>
<td>Physical Developer (working solution)</td>
<td>Sebaceous test print on porous surface</td>
<td>Grey/black visible print</td>
<td>Reagent QC Lot (lot); Case Notes (use)</td>
</tr>
<tr>
<td>Silver Nitrate</td>
<td>Metal chloride salt test print on porous surface</td>
<td>Grey/black visible print</td>
<td>Reagent QC Lot (lot); Case Notes (use)</td>
</tr>
<tr>
<td>CA Fuming</td>
<td>Sebaceous test print on non-porous surface</td>
<td>White visible print</td>
<td>Reagent QC Log (lot); Case Notes (use)</td>
</tr>
<tr>
<td>RAM</td>
<td>CA-fumed test print on non-porous surface</td>
<td>Luminescent print under laser</td>
<td>Reagent QC Log (lot); Case Notes (use)</td>
</tr>
<tr>
<td>R6G</td>
<td>CA-fumed test print on non-porous surface</td>
<td>Luminescent print under laser</td>
<td>Reagent QC Log (lot); Case Notes (use)</td>
</tr>
<tr>
<td>Amido Black</td>
<td>Protein test print on non-porous surface</td>
<td>Blue/black visible print</td>
<td>Reagent QC Log (lot); Case Notes (use)</td>
</tr>
<tr>
<td>Acid Yellow 7</td>
<td>Protein test print on non-porous surface</td>
<td>White/yellow ridges under ALS at 400-490nm or laser (orange filter)</td>
<td>Reagent QC Log (lot); Case Notes (use)</td>
</tr>
<tr>
<td>Crystal (Gentian) Violet</td>
<td>Sebaceous test print on adhesive surface of tape</td>
<td>Dark purple visible print</td>
<td>Reagent QC Log (lot); Case Notes (use)</td>
</tr>
<tr>
<td>Fingerprint Powder</td>
<td>Sebaceous test print on non-porous surface</td>
<td>Grey/black visible print</td>
<td>Reagent QC Log (lot); Case Notes (use)</td>
</tr>
<tr>
<td>Small Particle Reagent</td>
<td>Sebaceous test print on non-porous surface</td>
<td>Grey/black visible print</td>
<td>Reagent QC Log (lot); Case Notes (use)</td>
</tr>
<tr>
<td>WetWop</td>
<td>Sebaceous test print on adhesive surface of tape</td>
<td>Grey/black or white visible print</td>
<td>Reagent QC Log (lot); Case Notes (use)</td>
</tr>
</tbody>
</table>
9.0.10 Method Selection

The analyst will use scientifically valid techniques and methods for developing friction ridge impressions. Valid techniques and methods must come from peer reviewed sources including, but not limited to: *Journal of Forensic Identification* published by the International Association for Identification; *Journal of Forensic Science* published by the American Academy of Forensic Scientists; *Forensic Science International* published by Elsevier, *Manual of Fingerprint Development Techniques* published by the United Kingdom Police Scientific Branch; and *Processing Guide for Developing Latent Prints* published by the Federal Bureau of Investigation. These techniques and methods may be suitable for use by the LVMPD Forensic Laboratory once the procedures have been demonstrated as capable of producing valid results. There are a myriad of techniques available for the development of friction ridge impressions on different surfaces. The following subsections outline the typical processing techniques available for use in this laboratory. Validation procedures for using additional techniques from other published sources are outlined in the LVMPD Forensic Laboratory Quality Manual section 7.2. Depending on the evidence, not all typical processes will be used. The analyst must use discretion in determining which method will optimize development of friction ridge impressions.

Appropriate personal protective equipment must be worn at all times when handling evidence and the analysts must change gloves before handling evidence from another case. See additional safety information for each latent print development technique.

9.0.11 Porous Surface Processing

Porous surfaces are those that quickly absorb latent print residue. The most commonly encountered example of a porous surface is paper. Research suggests that some water soluble components of latent print residue are immediately absorbed into the surface upon touch and diffuse into the substrate matrix. The rate and extent of this diffusion is highly variable and dependent upon the properties of the substrate itself as well as environmental factors like temperature and relative humidity. Studies indicate that chloride salts are the most mobile and may demonstrate significant diffusion over time. Amino acids are less mobile but can diffuse in environmental conditions where the relative humidity exceeds 80%.

Non-water soluble components of latent print residue, generally a mixture of lipids, remain on the surface of the substrate for an extended period. This lipid based portion of the residue will migrate into the substrate matrix over time. Ambient temperature is the primary factor influencing migration. Research suggests that at temperatures above 95 °F mobility of the lipid fraction greatly increases. Even with such migration, researchers have found that a small, less mobile fraction of the non-water soluble components remain present on the surface of the substrate as well. Both fractions need to be considered when chemically processing.

In addition to migration concerns, researchers have found that some components of the lipid fraction of latent print residue are soluble in certain organic solvents with low dielectric constants including petroleum ether, hexane, and pentane. In sequential processing, care must be taken to avoid reagents prepared with these solvents because they will remove the “fragile” portion of the lipid fraction and possibly decrease the effectiveness of lipid targeting reagents.
In November of 2009, the Latent Print Detail undertook a performance study evaluating the chemicals used in the porous processing sequence. The study examined the performance of Oil Red O when processing latent prints aged 4 weeks. In this portion of the study, it was determined that Oil Red O processing resulted in no high quality latent prints when used on the aged evidence. It is important to note that most evidence processed regularly in the LVMPD Latent Print Detail has been held at the evidence vault for a period of over four weeks.

9.0.12 Non-Porous Surfaces

A non-porous surface is one that does not absorb any component of latent print residue. Examples of non-porous surfaces are glass, smooth plastic and shiny metal. Latent print residue deposited on a non-porous surface remains on the surface until it degrades or is removed by physical contact. Care must be taken when handling and packaging non-porous evidence so as not to remove fragile impressions through physical abrasion.

9.1 Sequential Processing

No single technique exists for the chemical development of all latent prints however sequential chemical processing can be used to efficiently target as many components as possible. When determining the appropriate sequential processing plan it is necessary to consider the porosity of the surface and the targeted components of the latent print residue. Typical sequential processing plans for porous and non-porous surfaces are noted below.

9.1.1 Typical Sequential Processing for Porous Evidence

- Visual observation using visible (white) or alternative light sources
- 1,2 Indanedione-Zinc
- Physical Developer (Physical Developer is not a currently validated method)

9.1.2 Typical Sequential Processing for Non-Porous Evidence

- Visual observation using visible (white) or alternative light sources
- Cyanoacrylate Ester Fuming (CA Fuming)
- RUVIS (smooth, non-porous surfaces only)
- Fluorescent Dye Stain (RAM, R6G, MRM-10)

9.1.3 References

9.2 Visual Examination

9.2.1 Purpose

Visual examination is always the first technique used to detect latent prints. Visual examination occurs prior to the application of any reagent or material for the development of latent prints. The ridge detail may be observed prior to processing if:

A. The ridge detail was recorded in a transparent substance (e.g. sweat or oil) and is in contrast with the background.
B. The ridge detail was recorded in dust.
C. The ridge detail was recorded in a colored substance, such as blood, ink, grease, or paint.
D. The ridge detail was impressed in a soft material, such as wax or putty.
E. The ridge detail was the result of a reaction between a fingerprint and a surface, causing the print detail to “etch” onto the surface (i.e., brass).

9.2.2 Method

Visual examination of the item or surface for ridge detail may be assisted by using a flashlight, ALS, RUVIS, or other source of light. With the source of light at various angles (i.e., oblique), examine the surface for visible ridge detail. Photograph any visible ridge detail suitable for recovery. It should be noted that RUVIS is most effective after CA fuming.

9.2.3 Safety

Take precautions to prevent the loss of trace evidence and cross contamination. Gloves will be worn while handling evidence at all times. This will keep the evidence free from external contaminants from the hands of the analyst and will protect the analyst from potentially hazardous materials on the evidence.

9.2.4 References

9.3 1,2 Indanedione-Zinc (IND)

9.3.1 1,2 Indanedione-Zinc (IND) for Normal Paper

9.3.1.1 Purpose

IND is a fluorescent analogue of ninhydrin and is used to develop latent prints on porous (e.g. paper) and semi-porous surfaces (e.g. leather or wood). IND should NOT be used on cardboard, recycled paper products, and newspaper; DFO or ninhydrin are better suited for these surfaces. Like DFO and ninhydrin, IND reacts with amino acids in the latent print residue. IND prints tend to appear pink (compared to the color obtained with ninhydrin) and are highly luminescent. IND can be used after cyanoacrylate ester (CA) fuming of a semi-porous item.

When IND is used, it is typically not necessary for the analyst to also use DFO and ninhydrin further in the sequence of development. IND may be followed by Oil Red O or Physical Developer. IND will not work on evidence that has been wet.

IND may interfere with other forensic examinations (i.e., handwriting, DNA). These examinations should be completed prior to processing the evidence item with IND.

9.3.1.2 Method Normal Paper

Working in a fume hood, thoroughly soak the evidence with IND and allow evidence to dry. The evidence may be placed in a dish or plastic bag with enough IND to cover the evidence or the evidence may be dipped into a dish containing IND. When dipping, it is best to soak and dry the item a second time. A control print is to be tested at the time of use to ensure the IND is working properly.

Place item(s) in an environmental chamber at 65% humidity and 80°C Celsius for approximately 10 - 20 minutes. Alternatively, an iron with steam may be used.

Examine item with white light and laser or ALS, being sure to use the appropriate filters for the laser and ALS (orange or red). The appropriate ALS excitation range for IND is 450nm-570nm. Any latent prints suitable for recovery developed or enhanced by IND will be photographed or scanned.

Thermal Paper

See 9.3.2

9.3.1.3 Safety

Use appropriate personal protective equipment when preparing or applying IND solution. Preparation and application of IND solution will be done in a fume hood or well ventilated area. Be careful opening the door to the environmental chamber as heat and steam could cause injury to any exposed skin. Dispose of unused solution in the proper chemical disposal container. Do NOT pour remaining solution back into the IND solution bottle.
9.3.1.4 Reagent Preparation

<table>
<thead>
<tr>
<th>Chemicals</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anhydrous ethanol (Absolute alcohol - 200 proof)</td>
<td>Balance</td>
</tr>
<tr>
<td>Zinc chloride</td>
<td>Graduated Cylinder</td>
</tr>
<tr>
<td>1,2-Indanedione (IND)</td>
<td>Glass beaker</td>
</tr>
<tr>
<td>Ethyl acetate</td>
<td>Magnetic stir rod</td>
</tr>
<tr>
<td>Glacial acetic acid</td>
<td>Amber storage bottles</td>
</tr>
<tr>
<td>HFE-7100</td>
<td></td>
</tr>
</tbody>
</table>

Mixing Instructions

Zinc Chloride Stock Solution

<table>
<thead>
<tr>
<th>For 0.5 Liter of IND working</th>
<th>For 1 Liter of IND working</th>
<th>For 2 Liters of IND working</th>
<th>Chemical</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.4 g</td>
<td>0.8 g</td>
<td>1.6 g</td>
<td>Zinc chloride</td>
</tr>
<tr>
<td>10 mL</td>
<td>20 mL</td>
<td>40 mL</td>
<td>Anhydrous ethanol</td>
</tr>
</tbody>
</table>

Combine ingredients in a beaker and stir with a magnetic stir bar on a stir plate until the solid dissolves completely. Make a fresh stock solution for every working solution of IND.

Shelf life: One time use

IND Working Solution

<table>
<thead>
<tr>
<th>~0.5 Liter</th>
<th>~1 Liter</th>
<th>~2 Liter</th>
<th>Chemical</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.4 g</td>
<td>0.8 g</td>
<td>1.6 g</td>
<td>1,2-Indanedione</td>
</tr>
<tr>
<td>45 mL</td>
<td>90 mL</td>
<td>180 mL</td>
<td>Ethyl Acetate</td>
</tr>
<tr>
<td>5 mL</td>
<td>10 mL</td>
<td>20 mL</td>
<td>Glacial acetic acid</td>
</tr>
<tr>
<td>8 mL</td>
<td>16 mL</td>
<td>32 mL</td>
<td>Zinc Chloride Stock Solution</td>
</tr>
<tr>
<td>450 mL</td>
<td>900 mL</td>
<td>1800 mL</td>
<td>HFE-7100</td>
</tr>
</tbody>
</table>

Grind 1,2-Indanedione. Combine IND and Ethyl acetate in a beaker with a magnetic stir rod and stir until solid dissolves completely. After IND is thoroughly dissolved, slowly add glacial acetic acid and stir until combined. Add Zinc Chloride Stock Solution and HFE-7100. Store in an amber bottle.

Shelf Life: 6 months
9.3.2 1,2 Indanedione-Zinc (Thermal- IND) for Thermal Paper

9.3.2.1 Purpose

A modified IND treatment can be used to develop latent prints on thermal paper. The modified formulation does not contain acetic acid and development is allowed to proceed at room temperature (i.e., no heat applied to accelerate development).

IND is a fluorescent analogue of ninhydrin and is used to develop latent prints on porous (e.g. paper) and semi-porous surfaces (e.g. leather or wood). IND should NOT be used on cardboard, recycled paper products, and newspaper; DFO or ninhydrin are better suited for these surfaces. Like DFO and ninhydrin, IND reacts with amino acids in the latent print residue. IND prints tend to appear pink (compared to the color obtained with ninhydrin) and are highly luminescent. IND can be used after cyanoacrylate ester (CA) fuming of a semi-porous item.

When IND is used, it is typically not necessary for the analyst to also use DFO and ninhydrin further in the sequence of development. IND may be followed by Oil Red O or Physical Developer. IND will not work on evidence that has been wet.

IND may interfere with other forensic examinations (i.e., handwriting, DNA). These examinations should be completed prior to processing the evidence item with IND.

9.3.2.2 Method

Working in a fume hood, thoroughly soak the evidence with Thermal IND and allow evidence to dry. The evidence may be placed in a dish or plastic bag with enough IND to cover the evidence or the evidence may be dipped into a dish containing IND (Do not treat more than 10 documents with the same tray of working solution). If you notice that the working solution becomes cloudy, stop using it and discard into the proper chemical disposal container.

A control print is to be tested at the time of use to ensure the IND is working properly.

Treated item(s), once dry, should be stored in the dark and allowed to develop at room temperature for at least 24 hours.

Examine item with white light and laser or ALS, being sure to use the appropriate filters for the laser and ALS (orange or red). The appropriate ALS excitation range for IND is 450nm-570nm. Any latent prints suitable for recovery developed or enhanced by IND will be photographed or scanned

9.3.2.3 Safety

Use appropriate personal protective equipment when preparing or applying Thermal IND solution. Preparation and application of Thermal IND solution will be done in a fume hood or well-ventilated area. Dispose of unused solution in the proper chemical disposal container. Do NOT pour remaining solution back into the Thermal IND solution bottle.
9.3.2.4 Reagent Preparation

### Chemicals

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anhydrous ethanol (Absolute alcohol - 200 proof)</td>
<td>Balance</td>
</tr>
<tr>
<td>Zinc chloride</td>
<td>Graduated Cylinder</td>
</tr>
<tr>
<td>1,2-Indanedione (IND)</td>
<td>Glass beaker</td>
</tr>
<tr>
<td>Ethyl acetate</td>
<td>Magnetic stir rod</td>
</tr>
<tr>
<td>HFE-7100</td>
<td>Amber storage bottles</td>
</tr>
</tbody>
</table>

### Mixing Instructions

#### Zinc Chloride Stock Solution

**For Thermal IND Working**

<table>
<thead>
<tr>
<th>Chemical</th>
<th>~0.5 Liter</th>
<th>~1 Liter</th>
<th>~2 Liters</th>
<th>Chemical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc chloride</td>
<td>0.8 g</td>
<td>0.35 g</td>
<td>0.70 g</td>
<td>1,2-Indanedione</td>
</tr>
<tr>
<td>Anhydrous ethanol</td>
<td>20 mL</td>
<td>40 mL</td>
<td>80 mL</td>
<td>Ethyl Acetate</td>
</tr>
<tr>
<td>HFE-7100</td>
<td>2 mL</td>
<td>4 mL</td>
<td>8 mL</td>
<td>Zinc Chloride Stock Solution</td>
</tr>
</tbody>
</table>

Combine ingredients in a beaker and stir with a magnetic stir bar on a stir plate until the solid dissolves completely. Make a fresh stock solution for every working solution of Thermal IND.

**Shelf life:** One time use

#### Thermal IND Working Solution

Grind 1,2-Indanedione. Combine IND and Ethyl acetate in a beaker with a magnetic stir rod and stir until solid dissolves completely. After IND is thoroughly dissolved, slowly add HFE-7100 and stir until combined. Add Zinc Chloride Stock Solution and HFE-7100. Store in an amber bottle.

**Shelf Life:** 3 months
9.3.3 Disposal Instructions

See Appendix F

9.3.4 References

- BVDA 1,2-Indanedione product information.
- Chesapeake Bay Division IAI website. *Latent Fingerprint Processing Techniques - 1,2 Indanedione*.
- Kasper, S.P.; Minnillo, D.J; and Rockhold, A.M. *Validating IND (1,2-Indanedione)*. Forensic Science Communications 4(4) 2002.
- Lightening Powder Company 1,2-Indanedione product information.
9.4 1,8 Diazafuoren-9-one (DFO)

9.4.1 Purpose

DFO is a fluorescent analogue of ninhydrin and is used to develop latent prints on porous and semi-porous surfaces (e.g. leather or wood). Like Indanedione and ninhydrin, DFO reacts with amino acids in the latent print residue. DFO should be used when the surface is multicolored or when the surface provides poor contrast to Ruhemann’s Purple (product of ninhydrin’s reaction to amino acids). DFO prints tend to be a faint purple (compared to the color obtained with ninhydrin) and are highly luminescent. DFO can be used after cyanoacrylate ester (CA) fuming of a semi-porous item. DFO will not work on evidence that has been wet.

If also using Indanedione, it should be applied prior to DFO (based on a 2009 internal study regarding sequencing of amino acid reagents). After DFO, the next steps in sequential processing would be ninhydrin (when applicable) followed by Oil Red O or Physical Developer.

DFO may interfere with other forensic examinations (i.e., handwriting, DNA). These examinations should be completed prior to processing the evidence item with DFO.

9.4.2 Method

Working in a fume hood, thoroughly soak the evidence with DFO and allow evidence to dry. Place item in an environmental chamber (no humidity added) at 50° - 100° Celsius for approximately 10 - 20 minutes. Alternatively, a dry iron (no steam) may be used. A control print is to be tested at the time of use to ensure the DFO is working properly.

Examine item with white light and laser or ALS, being sure to use the appropriate filters for the laser and ALS (orange or red). The appropriate ALS excitation range for DFO is 450nm-570nm. Any latent prints suitable for recovery developed or enhanced by DFO will be photographed.

9.4.3 Safety

Use appropriate personal protective equipment when preparing or applying DFO solution. Preparation and application of DFO solution will be done in a fume hood or well-ventilated area. Be careful opening the door to the environmental chamber as heat and steam could cause injury to any exposed skin. Dispose of unused solution in the proper chemical disposal container. Do NOT pour remaining solution back into the DFO solution bottle.

9.4.4 Reagent Preparation

<table>
<thead>
<tr>
<th>Chemicals</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>DFO (1,8-Diazafuoren-9-One)</td>
<td>Balance</td>
</tr>
<tr>
<td>Methanol</td>
<td>Graduated Cylinder</td>
</tr>
<tr>
<td>Glacial acetic acid</td>
<td>Glass beaker</td>
</tr>
<tr>
<td>HFE-7100</td>
<td>Magnetic stir rod</td>
</tr>
<tr>
<td></td>
<td>Amber storage bottles</td>
</tr>
</tbody>
</table>
Mixing Instructions

<table>
<thead>
<tr>
<th>0.5 Liter</th>
<th>1 Liter</th>
<th>2 Liters</th>
<th>Chemical</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.125 g</td>
<td>0.25 g</td>
<td>0.5 g</td>
<td>DFO (1,8-Diazafluoren-9-One)</td>
</tr>
<tr>
<td>20 mL</td>
<td>40 mL</td>
<td>80 mL</td>
<td>Methanol</td>
</tr>
<tr>
<td>10 mL</td>
<td>20 mL</td>
<td>40 mL</td>
<td>Glacial acetic acid</td>
</tr>
<tr>
<td>470 mL</td>
<td>940 mL</td>
<td>1880 mL</td>
<td>HFE-7100</td>
</tr>
</tbody>
</table>

Dissolve DFO in methanol in a beaker - stir with a magnetic stir rod until solid starts to dissolve. Add glacial acetic acid and continue mixing until all DFO has dissolved. After DFO is thoroughly dissolved, add HFE-7100.

Cover and let solution settle for approximately 30 minutes. A thin oily film may form on the top of the solution. The oily film must be removed prior to use. Use a separatory funnel or pipette to skim the oily film from the top of the solution and discard. Store solution in an amber bottle.

Shelf life: 6 months

9.4.5 Disposal Instructions

See Appendix F

9.4.6 References

- 3M Novec Engineering Fluid HFE-7100 Product Information 2005
- 3M Novec Engineering Fluid HFE-7100 Instruction sheet for mixing HFE-7100 with Ninhydrin or DFO
- Chesapeake Bay Division IAI website, Latent Fingerprint Processing Techniques - DFO.
9.5 Ninhydrin

9.5.1 Purpose

Ninhydrin (1,2,3-indantrione monohydrate) is a reagent used to develop latent prints on porous and semi-porous surfaces. Ninhydrin reacts with amino acids in the latent print residue, forming a dark purple product called Ruhemann’s Purple. Ninhydrin can be used after cyanoacrylate ester (CA) fuming of a semi-porous item.

For porous surfaces, ninhydrin is generally used after Indanedione or DFO treatment and before Oil Red O or Physical Developer. Ninhydrin is not recommended on dark surfaces. Ninhydrin will not work on evidence that has been wet.

Ninhydrin will react with many of the amino acids present in latent print residue. Most reactions will proceed quickly when encouraged with heat and humidity. Some of the reactions will take longer to progress, resulting in the appearance of additional latent prints hours or even days after initial processing.

Ninhydrin may interfere with other forensic examinations (i.e., handwriting, DNA). These examinations should be completed prior to processing the evidence item with Ninhydrin.

9.5.2 Method

Working in a fume hood, thoroughly soak the item with ninhydrin and allow evidence to dry. To expedite development, place the items in an environmental chamber at approximately 80°Celsius and 65% humidity for 10-20 minutes. A steam iron may also be used (10 seconds at 160°C with steam). A control print is to be tested at the time of use to ensure the ninhydrin is working properly.

Any latent prints suitable for recovery developed or enhanced by ninhydrin will be photographed.

9.5.3 Safety

Use appropriate personal protective equipment when preparing or applying ninhydrin solution. Preparation and application of ninhydrin solution will be done in a fume hood or well-ventilated area. Be careful opening the door to the environmental chamber as heat and steam could cause injury to any exposed skin. Dispose of unused solution in the proper chemical disposal container. Do NOT pour remaining solution back into the ninhydrin solution bottle.

9.5.4 Reagent Preparation

<table>
<thead>
<tr>
<th>Chemicals</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ninhydrin crystals</td>
<td>Balance</td>
</tr>
<tr>
<td>Anhydrous ethanol (200 proof)</td>
<td>Graduated Cylinder</td>
</tr>
<tr>
<td>Ethyl acetate</td>
<td>Glass beaker</td>
</tr>
<tr>
<td>Glacial acetic acid</td>
<td>Magnetic stir rod</td>
</tr>
<tr>
<td>HFE-7100</td>
<td>Amber storage bottles</td>
</tr>
</tbody>
</table>
Mixing Instructions

<table>
<thead>
<tr>
<th></th>
<th>0.5 Liter</th>
<th>1 Liter</th>
<th>2 Liters</th>
<th>Chemical</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5 g</td>
<td>5 g</td>
<td>10 g</td>
<td></td>
<td>Ninhydrin crystals</td>
</tr>
<tr>
<td>22.5 mL</td>
<td>45 mL</td>
<td>90 mL</td>
<td></td>
<td>Anhydrous ethanol</td>
</tr>
<tr>
<td>1 mL</td>
<td>2 mL</td>
<td>4 mL</td>
<td></td>
<td>Ethyl acetate</td>
</tr>
<tr>
<td>2.5 mL</td>
<td>5 mL</td>
<td>10 mL</td>
<td></td>
<td>Glacial acetic acid</td>
</tr>
<tr>
<td>500 mL</td>
<td>1000 mL</td>
<td>2000 mL</td>
<td></td>
<td>HFE-7100</td>
</tr>
</tbody>
</table>

Dissolve ninhydrin crystals in anhydrous ethanol in a beaker while stirring with a magnetic stir rod. Add ethyl acetate and continue to stir. Add glacial acetic acid and continue mixing until solid dissolves completely. After ninhydrin is thoroughly dissolved, add HFE-7100 and mix until an opaque yellow solution is formed.

Cover and let solution settle for approximately 30 minutes. Decant solution into an amber bottle.

Shelf life: 1 year

9.5.5 Disposal Instructions

See Appendix F

9.5.5 References

- 3M Novec Engineering Fluid HFE-7100 Instruction sheet for mixing HFE-7100 with ninhydrin or DFO.
- Chesapeake bay Division IAI website. Latent Fingerprint Processing Techniques - Ninhydrin.
9.6 Oil Red O (ORO)

9.6.1 Purpose

Oil Red O (ORO) is a lipid dye stain that reacts with the insoluble lipid components of latent fingerprint residue. ORO produces a strong red color when lipids are present. Its development will result in well-defined red ridges with a pink background. The developed impression can be seen in natural light and its color appears to be stable over time. ORO is most successfully used on paper items.

ORO is similar to Physical Developer in that it targets the insoluble components of fingerprint residue on porous surfaces. The advantage of ORO is its ease of use. ORO requires immersion in the ORO stain and then a post wash to return the sample to a neutral pH. Current research suggests that ORO is most successful when used on samples that are less than 1 month old. This is contrasted with Physical Developer which can effectively develop aged latent prints. ORO can develop latent prints after submersion in water however the quality of the prints developed decreases with an increase in submersion time. Because of this, Physical Developer may be more effective on paper that has been submerged for an extended period of time.

ORO can be sequenced with the processing methods commonly used to target the amino acid components of latent print residue as long as the chemicals used are not formulated with petroleum ether (see Section 9.0.8). ORO can follow processing with IND, DFO, Ninhydrin, and can precede Physical Developer. In other words, a porous item can be processed using the following sequence of chemicals: IND (or DFO and Ninhydrin), ORO, then Physical Developer.

ORO may interfere with other forensic examinations (i.e., handwriting, DNA). These examinations should be completed prior to processing the evidence item with ORO.

9.6.2 Method

Oil Red O Application

Add enough ORO stain to a glass tray or a plastic bag to cover the piece of evidence and control print. Agitate using an orbital shaker until the control print and any prints on the evidence are adequately visualized. This can take up to thirty minutes but often development happens within 5 minutes.

Water Post-Wash

All items of evidence processed should undergo Water Post-wash after submersion in the ORO stain. Add enough distilled water to a glass tray or plastic bag to cover the evidence. Agitate using an orbital shaker for 5 minutes. Allow evidence to air dry on a paper towel. Any latent prints suitable for recovery developed or enhanced by ORO will be photographed.

A control print will be processed with the evidence to ensure that the ORO is working properly. The control print should be deposited on a surface similar to the evidence being processed.
9.6.3 Safety

Acid/ Base Precautions

Preparation of the Oil Red O Stain solution requires the management of a strong base. The following precautions should be taken:

- Always wear protective eye wear and gloves.
- Thoroughly rinse any part of the body that might come into contact with a base.
- Work inside the fume hood with the sash down.
- Use secondary containers to transport bases to and from storage room.
- Always add a base to water.
- Dispose of unused solution per laboratory policy.

9.6.4 Reagent Preparation

**Oil Red O Stain Solution**

<table>
<thead>
<tr>
<th>Chemicals</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil Red O</td>
<td>Balance</td>
</tr>
<tr>
<td>Methanol</td>
<td>Graduated Cylinder</td>
</tr>
<tr>
<td>Sodium Hydroxide (stored in Seized Drugs)</td>
<td>Glass beaker</td>
</tr>
<tr>
<td>Distilled water</td>
<td>Magnetic stir rod</td>
</tr>
<tr>
<td></td>
<td>Clear storage bottles</td>
</tr>
<tr>
<td></td>
<td>Funnel</td>
</tr>
<tr>
<td></td>
<td>Filter paper</td>
</tr>
<tr>
<td></td>
<td>Vacuum flask</td>
</tr>
<tr>
<td></td>
<td>Vacuum pump</td>
</tr>
</tbody>
</table>

**Mixing Instructions**

<table>
<thead>
<tr>
<th>1 Liter</th>
<th>Chemical</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.54 g</td>
<td>Oil Red O</td>
</tr>
<tr>
<td>770 mL</td>
<td>Methanol</td>
</tr>
<tr>
<td>9.2 g</td>
<td>Sodium Hydroxide</td>
</tr>
<tr>
<td>230 mL</td>
<td>Distilled Water</td>
</tr>
</tbody>
</table>

Measure 770 mL of methanol into a 2 L beaker. Weigh out 1.54 g of Oil Red O. Dissolve the Oil Red O powder into the methanol. **Oil Red O Powder is very fine and can stain! Be careful not to contaminate the balance when weighing it!**

Measure 230 mL of distilled water into a 500 mL beaker. Weigh out 9.2 g of NaOH (sodium hydroxide). Pour into the distilled water stirring constantly with the magnetic stir bar.

Add the sodium hydroxide solution to the Oil Red O/Methanol Solution stirring constantly. Continue to stir solution for 5 minutes. Small particles will be present in the solution. Filter the solution using vacuum flask filter and pump. After filtering, transfer solution into an amber bottle using a funnel and then store away from light.

Shelf life: 9 months
9.6.5 Disposal Instructions

See Appendix F

9.6.5 References

9.7 Physical Developer (PD)

Under review and performance check/validation

9.7.1 References

- Champod, Christophe; Lennard, Chris; Margot, Pierre & Stoilovic, Milutin. *Fingerprints and other Ridge Skin Impression*. CRC International Forensic Science and Investigation Series, CRC Press 2004
9.8 Silver Nitrate

9.8.1 Purpose

Silver nitrate is used for the development of latent prints on most porous surfaces, particularly cardboard and untreated wood. Silver nitrate reacts with chloride (from sodium chloride) found in latent print residue to form silver chloride. Upon exposure to light, the silver chloride is reduced to silver metal and latent prints turn a dark gray color. This method may be used after IND, DFO and ninhydrin. It should not be used in any sequence with physical developer.

This method is destructive. It creates a strong background reaction that results in a darkening of the item over time. Developed latent prints must be immediately photographed.

Silver nitrate may interfere with other forensic examinations (i.e., handwriting, DNA). These examinations should be completed prior to processing the evidence item with silver nitrate.

9.8.2 Method

Working under a fume hood, thoroughly soak the item with silver nitrate and allow item to dry. Do not handle with metal tongs, plastic only.

Expose the evidence to a light source such as direct sunlight, photo flood lights, arc lights, or ultraviolet light. Development can happen quickly so it must be monitored closely. A control print on a porous surface is to be tested at the time of use to ensure the silver nitrate is working properly.

Immediately photograph any latent prints suitable for recovery developed or enhanced by silver nitrate.

Store the processed evidence in total darkness prior to and after photography to prevent rapid darkening of the entire sample.

9.8.3 Safety

Silver nitrate is toxic and can cause skin and tissue irritation. Use appropriate personal protective equipment when preparing or applying the silver nitrate solution. Preparation and application of the silver nitrate solution will be done in a fume hood or well-ventilated area. Dispose of unused solution in the proper chemical disposal container. Do NOT pour remaining solution back into the silver nitrate solution bottle.

9.8.4 Reagent Preparation

<table>
<thead>
<tr>
<th>Chemicals</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver Nitrate</td>
<td>Balance</td>
</tr>
<tr>
<td>Distilled water</td>
<td>Glass beakers</td>
</tr>
<tr>
<td>Ethyl alcohol</td>
<td>Magnetic stir rod</td>
</tr>
<tr>
<td></td>
<td>Amber storage bottle</td>
</tr>
<tr>
<td></td>
<td>Plastic tongs/forceps</td>
</tr>
</tbody>
</table>
Mixing Instructions

<table>
<thead>
<tr>
<th>≈1 Liter</th>
<th>≈2 Liters</th>
<th>Chemical</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 g</td>
<td>60 g</td>
<td>Silver Nitrate</td>
</tr>
<tr>
<td>100 mL</td>
<td>200 mL</td>
<td>Distilled water</td>
</tr>
<tr>
<td>1 L</td>
<td>2 L</td>
<td>Ethyl alcohol</td>
</tr>
</tbody>
</table>

Combine silver nitrate and distilled water and stir until all crystals are dissolved. Add this solution to the ethyl alcohol. Store in an amber bottle.

Shelf Life: One year.

9.8.5 Disposal Instructions

See Appendix F

9.8.6 References

9.9 Cyanoacrylate Ester (CA) Fuming (aka “Superglue®” Fuming)

9.9.1 Purpose

CA fuming is used to detect and visualize latent prints on semi-porous and non-porous surfaces. When heated, CA forms a vapor. Polymerization of the CA is initiated by the lactate ions present in latent print residue. CA polymerization forms polycyanoacrylate. The polycyanoacrylate causes the latent print to appear white in color. This process can be accelerated by heat, humidity, or sodium hydroxide. Smooth, non-porous surfaces should be examined with RUVIS after CA fuming. Refer to the "SceneScope Advance SC-Viewer-AD Reflected Ultra-Violet Imaging System User’s Guide" for operation instructions for the RUVIS.

On non-porous surfaces, CA fuming is followed by a fluorescent dye stain, such as MRM-10 or RAM. On semi-porous surfaces, CA can be used prior to powder, IND, DFO, or ninhydrin. If targeting latent prints in blood, it is generally better to proceed directly to protein staining procedures (e.g. amido black or acid yellow 7).

9.9.2 Method

Evidence is placed in a ventilated fuming chamber, being sure to minimize contact with the walls and floor of the chamber (leave as much of the surface area of the item exposed). Place appropriate amount of liquid CA in an aluminum dish.

Misonix Chamber

If using the Misonix chamber, the aluminum dish with liquid CA may be placed immediately on the heating element. The humidity level for Misonix chamber should be set at 80% with a fuming time of 10 – 20 minutes and a purge time of 10 – 20 minutes. These times may varying depending upon the evidence.

Follow the manufacturer’s instructions found in the Misonix Cyanoacrylate Fuming Chamber Operation Manual, pages 9 through 17. The Daily System Verification is not needed daily but is recommended before the first use on days the unit is used.

Foster + Freeman Chamber

If using the Foster + Freeman chamber, the aluminum dish with liquid CA may be place immediately on the heating element. The humidity level for Foster + Freeman chamber should be set at 60%-90% with a fuming time of 3 – 90 minutes and a purge time of 20 minutes. These times may varying depending upon the evidence.

Follow the manufacturer’s instructions found in the Foster + Freeman CA Chamber User Manual, pages 13 through 18 (Section 01).

Regardless of which chamber is used, a control print is to be tested at the time of fuming to ensure the CA is working properly.
Fuming times will vary depending upon the evidence and the size of the chamber. The analyst must monitor the evidence periodically to avoid over-polymerization. Any latent prints suitable for recovery developed or enhanced by CA fuming will be photographed.
RUVIS

RUVIS examination may be conducted on smooth, non-porous surfaces after CA fuming. Any latent prints suitable for recovery visualized or enhanced with the RUVIS will be photographed.

9.9.3 Safety

Use appropriate personal protective equipment when fuming with CA. CA fuming will be performed in a ventilated chamber, in a fume hood, or well-ventilated area. Avoid skin contact; the liquid can cause skin to bond. The glue may be softened with acetone or methyl ethyl ketone (MEK) in an emergency (acetone and MEK are flammable - fire hazard). Keep away from eyes and avoid inhalation of CA vapors.

Use appropriate personal protective equipment when using the RUVIS. Avoid exposure to the ultra-violet light by wearing gloves, lab coat, and UV safety glasses.

9.9.4 References

- Misonix model CA-6000 instruction manual
9.10 RAM (Rhodamine 6G, Ardrox, and MBD)

9.10.1 Purpose

RAM is a fluorescent dye stain used to enhance CA developed latent prints. RAM is a solution of three luminescent dye stains: Rhodamine 6G, Ardrox, and 7-(P-Methoxybenzlamino-4Nitrobenz-2-Oxa-1,3-Diazile) (also known as MBD). The solvents used in RAM soften the CA polymer, allowing penetration of the stains without damaging the latent print. This method is effective on all colors of non-porous surfaces. RAM, and any other CA dye stain, is used prior to application of any powders.

9.10.2 Method

After a non-porous item has been treated with CA fuming, RAM is applied (under a fume hood) by spraying or submerging the item in the RAM. Once dry, the item may be removed from the fume hood and examined using a laser or ALS (excitation range 430 - 530) and appropriate filters.

A CA-fumed control print is to be tested at the time of use to ensure the RAM is working properly.

Any latent prints suitable for recovery developed or enhanced by RAM will be photographed.

9.10.3 Safety

Use appropriate personal protective equipment when preparing or applying RAM. Preparation and application of RAM will be done in a fume hood or well-ventilated area. Dispose of unused solution in the proper chemical disposal container. Do NOT pour remaining solution back into the RAM solution bottle.

9.10.4 Reagent Preparation

### R6G Stock Solution

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rhodamine 6G</td>
<td>Balance</td>
</tr>
<tr>
<td>Methanol</td>
<td>Graduated cylinder</td>
</tr>
<tr>
<td></td>
<td>Glass beaker</td>
</tr>
<tr>
<td></td>
<td>Magnetic stir rod</td>
</tr>
<tr>
<td></td>
<td>Amber storage bottle</td>
</tr>
</tbody>
</table>

**Mixing Instructions**

<table>
<thead>
<tr>
<th>1 Liter</th>
<th>Chemical</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 g</td>
<td>Rhodamine 6G</td>
</tr>
<tr>
<td>1 L</td>
<td>Methanol</td>
</tr>
</tbody>
</table>

Combine the above ingredients in a beaker with a stir rod and mix until the Rhodamine 6G is dissolved. Store in amber bottle.

Shelf Life: Three years (laboratory default expiration).
Disposal Instructions

See Appendix F

### MBD Stock Solution

<table>
<thead>
<tr>
<th>Chemicals</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBD</td>
<td>Balance</td>
</tr>
<tr>
<td>Acetone</td>
<td>Graduated cylinder</td>
</tr>
<tr>
<td></td>
<td>Glass beaker</td>
</tr>
<tr>
<td></td>
<td>Magnetic stir rod</td>
</tr>
<tr>
<td></td>
<td>Amber storage bottle</td>
</tr>
</tbody>
</table>

### Mixing Instructions

1. Combine the above ingredients in a beaker with a stir rod and mix until the MBD is dissolved. Store in amber bottle.

2. Shelf Life: Three years (laboratory default expiration).

Disposal Instructions

See Appendix F

### RAM Working Solution

<table>
<thead>
<tr>
<th>Chemicals</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>R6G Stock Solution</td>
<td>Graduated cylinder</td>
</tr>
<tr>
<td>Ardrox P-133D</td>
<td>Glass beaker</td>
</tr>
<tr>
<td>MBD Stock Solution</td>
<td>Amber storage bottle</td>
</tr>
<tr>
<td>Methanol</td>
<td></td>
</tr>
<tr>
<td>Isopropanol</td>
<td></td>
</tr>
<tr>
<td>Acetonitrile</td>
<td></td>
</tr>
<tr>
<td>Petroleum ether</td>
<td></td>
</tr>
</tbody>
</table>

### Mixing Instructions

<table>
<thead>
<tr>
<th>1 Liter</th>
<th>2 Liters</th>
<th>4 Liters</th>
<th>Chemical</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 mL</td>
<td>6 mL</td>
<td>12 mL</td>
<td>R6G Stock Solution</td>
</tr>
<tr>
<td>2 mL</td>
<td>4 mL</td>
<td>8 mL</td>
<td>Ardrox P-133D</td>
</tr>
<tr>
<td>7 mL</td>
<td>14 mL</td>
<td>28 mL</td>
<td>MBD Stock Solution</td>
</tr>
<tr>
<td>20 mL</td>
<td>40 mL</td>
<td>80 mL</td>
<td>Methanol</td>
</tr>
<tr>
<td>10 mL</td>
<td>20 mL</td>
<td>40 mL</td>
<td>Isopropanol</td>
</tr>
<tr>
<td>8 mL</td>
<td>16 mL</td>
<td>32 mL</td>
<td>Acetonitrile</td>
</tr>
<tr>
<td>950 mL</td>
<td>1900 mL</td>
<td>3800 mL</td>
<td>Petroleum ether</td>
</tr>
</tbody>
</table>
Combine the ingredients in the order listed - do NOT use a stir rod to mix. Store in an amber bottle.

Shelf Life: 30 days.

Disposal Instructions

See Appendix F

9.10.5 References

9.11 Rhodamine 6G (R6G)

9.11.1 Purpose

R6G is a fluorescent dye stain used to enhance CA developed latent prints. R6G fluoresces in a narrow range, 450 – 480nm, and is best suited for use with the Coherent Tracer Laser. The solvents used in R6G soften the CA polymer, allowing penetration of the stains without damaging the latent print. This method is effective on all colors of non-porous surfaces. R6G, and any other CA dye stain, is used prior to application of any powders. R6G can be followed by RAM or MRM-10 if needed.

9.11.2 Method

After a non-porous item has been treated with CA fuming, R6G is applied (under a fume hood) by spraying or submerging the item in the R6G. Once dry, the item may be removed from the fume hood and examined using the Tracer Laser or an ALS (excitation range 450 – 480nm) and appropriate filters.

A CA-fumed control print is to be tested at the time of use to ensure the R6G is working properly.

Any latent prints suitable for recovery developed or enhanced by R6G will be photographed.

9.11.3 Safety

Use appropriate personal protective equipment when preparing or applying R6G. Preparation and application of R6G will be done in a fume hood or well-ventilated area. Dispose of any unused solution in the proper chemical disposal container. Do NOT pour remaining solution back into the R6G solution bottle.

9.11.4 Reagent Preparation

**R6G Stock Solution**

<table>
<thead>
<tr>
<th>Chemicals</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rhodamine 6G</td>
<td>Balance</td>
</tr>
<tr>
<td>Methanol</td>
<td>Graduated cylinder</td>
</tr>
</tbody>
</table>

Mixing Instructions

<table>
<thead>
<tr>
<th>1 Liter</th>
<th>Chemical</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 g</td>
<td>Rhodamine 6G</td>
</tr>
<tr>
<td>1 L</td>
<td>Methanol</td>
</tr>
</tbody>
</table>

Combine the above ingredients in a beaker with a stir rod and mix until the Rhodamine 6G is dissolved. Store in amber bottle.

Shelf Life: Three years (laboratory default expiration).
Disposal Instructions

See Appendix F

R6G Working Solution

<table>
<thead>
<tr>
<th>Chemicals</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>R6G Stock Solution</td>
<td>Graduated cylinder</td>
</tr>
<tr>
<td>Acetone</td>
<td>Glass beaker</td>
</tr>
<tr>
<td>Acetonitrile</td>
<td>Amber storage bottle</td>
</tr>
<tr>
<td>Methanol</td>
<td></td>
</tr>
<tr>
<td>Isopropanol</td>
<td></td>
</tr>
<tr>
<td>Petroleum Ether</td>
<td></td>
</tr>
</tbody>
</table>

Mixing Instructions

<table>
<thead>
<tr>
<th></th>
<th>1 Liter</th>
<th>2 Liters</th>
<th>4 Liters</th>
<th>Chemical</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3 mL</td>
<td>6 mL</td>
<td>12 mL</td>
<td>R6G Stock Solution</td>
</tr>
<tr>
<td></td>
<td>15 mL</td>
<td>30 mL</td>
<td>60 mL</td>
<td>Acetone</td>
</tr>
<tr>
<td></td>
<td>10 mL</td>
<td>20 mL</td>
<td>40 mL</td>
<td>Acetonitrile</td>
</tr>
<tr>
<td></td>
<td>15 mL</td>
<td>30 mL</td>
<td>60 mL</td>
<td>Methanol</td>
</tr>
<tr>
<td></td>
<td>32 mL</td>
<td>64 mL</td>
<td>128 mL</td>
<td>Isopropanol</td>
</tr>
<tr>
<td></td>
<td>925 mL</td>
<td>1850 mL</td>
<td>3700 mL</td>
<td>Petroleum Ether</td>
</tr>
</tbody>
</table>

Combine the ingredients in the order listed - do NOT use a stir rod to mix. Store in amber bottle.

Shelf Life: 6 months.

Disposal Instructions

See Appendix F

9.11.5 References

9.12 Powders

9.12.1 Purpose

Latent print powders are used to develop ridge detail on semi-porous and non-porous surfaces. The powder adheres to the perspiration/oil residue in the latent print, allowing the ridge detail to be seen. Typically, the powder-processed print is tape lifted with transparent tape and placed on a lift card. The lift card will be a color in contrast with the color of the powder used (white card with black and Bi-chromatic™ powder, black card with silver powder). The powder-processed print may be lifted using white Mikrosil (or similar product) as well.

9.12.2 Method

Non-Magnetic powders

Using the appropriate brush (e.g. fiberglass, camel-hair, feather duster), dip the bristles of the brush into the powder. Apply a small amount of powder onto the surface and begin to brush lightly. Brush in the direction of any ridges that begin to appear. Stop brushing when the latent print reaches sufficient clarity. Clean any excess powder from between the ridges using a brush or cotton.

Magnetic Powders

Engage the magnet in the end of the magna brush wand and place into magnetic powder. Apply the powder to the surface in a circular manner, making sure that only the powder touches the surface, and not the wand. After the print has developed, release the magna powder back into the container and pass the clean wand over (not touching) the print to clean up any excess residue.

A control print is to be tested at the time of use to ensure that the powder is working properly.

Any latent prints suitable for recovery developed or enhanced by powders will be photographed. After photography, the latent prints may be lifted.

9.12.3 Safety

Perform powder processing in the chemical or particulate fume hood. Wear gloves and a lab coat when applying powder. If powder processing is not done in a fume hood, a particulate mask and safety goggles must be worn.

9.12.4 References

9.13 Amido Black

9.13.1 Purpose

Amido black dye is a general protein stain. Amido black is used to develop or enhance latent prints containing a blood matrix. Amido black will not react to the normal constituents of latent print residue, and may in fact destroy “normal” latent prints. Consequently, the analyst must determine whether or not they will target the blood prints or the “normal” latent prints. Amido black may interfere with later DNA analysis. When possible, DNA samples should be taken from areas of the print unlikely to yield ridge detail prior to application of amido black.

9.13.2 Method

The amido black process consists of two solutions (a developer and a rinse) and a final distilled or tap water rinse.

Apply the amido black solution to the evidence by dipping, using a rinse bottle, or pipetting. Leave the amido black on the surface for 30 seconds to one minute, and then rinse with glacial acetic acid/methanol rinse. Repeat if necessary to improve contrast of latent print. Apply a final rinse of distilled or tap water and allow items to dry.

A control print is to be tested at the time of use to ensure the amido black is working properly.

Any latent prints suitable for recovery developed or enhanced by amido black will be photographed.

9.13.3 Safety

Use appropriate personal protective equipment when preparing or applying amido black. Preparation and application of amido black will be done in a fume hood or well-ventilated area. Dispose of unused solution in the proper chemical disposal container. Do NOT pour remaining solution back into the amido black solution bottles.

Some of the solvents in this formula are hazardous and corrosive. Several of the solvents used, including glacial acetic acid, are flammable and pose a fire risk.

9.13.4 Reagent Preparation

<table>
<thead>
<tr>
<th>Chemicals</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naphthol blue black</td>
<td>Balance</td>
</tr>
<tr>
<td>Glacial acetic acid</td>
<td>Graduated Cylinder</td>
</tr>
<tr>
<td>Methanol</td>
<td>Glass beaker</td>
</tr>
<tr>
<td></td>
<td>Magnetic stir rod</td>
</tr>
<tr>
<td></td>
<td>Amber storage bottles</td>
</tr>
</tbody>
</table>
Mixing Instructions

<table>
<thead>
<tr>
<th>0.5 Liter</th>
<th>1 Liter</th>
<th>2 Liters</th>
<th>Chemical</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 g</td>
<td>2 g</td>
<td>4 g</td>
<td>Naphthol blue black</td>
</tr>
<tr>
<td>50 mL</td>
<td>100 mL</td>
<td>200 mL</td>
<td>Glacial acetic acid</td>
</tr>
<tr>
<td>450 mL</td>
<td>900 mL</td>
<td>1800 mL</td>
<td>Methanol</td>
</tr>
</tbody>
</table>

Combine all chemicals and stir until naphthol blue black is dissolved (approximately 30 minutes). Store in a clear or amber bottle.

Shelf life: Three years (laboratory default expiration).

Disposal Instructions

See Appendix F

Amido Black Rinse

<table>
<thead>
<tr>
<th>Chemicals</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glacial acetic acid</td>
<td>Balance</td>
</tr>
<tr>
<td>Methanol</td>
<td>Graduated Cylinder</td>
</tr>
</tbody>
</table>

Mixing Instructions

<table>
<thead>
<tr>
<th>0.5 Liter</th>
<th>1 Liter</th>
<th>2 Liters</th>
<th>Chemical</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 mL</td>
<td>100 mL</td>
<td>200 mL</td>
<td>Glacial acetic acid</td>
</tr>
<tr>
<td>450 mL</td>
<td>900 mL</td>
<td>1800 mL</td>
<td>Methanol</td>
</tr>
</tbody>
</table>

Combine glacial acetic acid and methanol and store in a clear or amber bottle.

Shelf life: Three years (laboratory default expiration).

Disposal Instructions

See Appendix F

9.13.5 References

9.14 Acid Yellow 7 (AY7)

9.14.1 Purpose

Acid Yellow 7 is a dye solution (stains blood protein) used to visualize fingerprints or shoeprints made in blood. It is a photo-luminescent reagent, and when used with a forensic light source, can improve the contrast to better visualize the latent, especially on dark substrates. It works best on non-porous surfaces (e.g. glass, tile, linoleum, plastic surfaces, and painted surfaces); however, research has shown it successful on porous surfaces such as black construction paper and leather.

The Acid Yellow process consists of three solutions: the Fixing Solution, the Working Solution, and the Wash Solution.

9.14.2 Method

Blood prints need to be fixed (stabilized) first by immersing in the Fixing Solution for about 5 minutes. Next, the item is immersed in the Working Solution, staining the blood a yellow-brown color. This is followed by several washes in the Wash Solution to remove excess dye and increase contrast of the print. Items are left to dry at room temperature, and photographs are taken of latent prints suitable for recovery.

**Step 1:** If the item to be processed is small enough, place it in a clean dish and immerse it in the Fixing Solution for 5 minutes. If item is too large, apply a wetted cloth (with Fixing Solution) to the surface and continue to wet it, allowing it to make contact for 5 minutes. Using a wash bottle or pipette and allowing the solution to run on the surface for 5 minutes is also an option, although less efficient.

**Step 2:** Repeat the same procedure in Step 1 with the Working Solution, allowing it to process for 5-10 minutes.

**Step 3:** Repeat the same procedure in Step 1 with the Wash Solution, gently rocking the dish until excess dye has been removed, allowing for the greatest contrast. 3-4 changes of the Wash Solution may be necessary.

**Step 4:** Allow item to dry at room temperature

**Step 5:** Using a forensic light source, view the processed item between 400-490nm (this blue-green light will excite luminescence). The ridges may appear as white-yellow on a black background. On some items, prints luminesce best between 530-570nm. Use this light source at the best wavelength to photograph latent prints of value for recovery.

A control print is to be tested at the same time of use to ensure the Acid Yellow is working properly.

9.14.3 Safety

Gloves, eye protection, and a well-ventilated area are recommended safety practices. 5-Sulfosalicylic Acid is labeled as an irritant, and due to the fixative effect on blood, gloves are
recommended. Acid Yellow 7 powder is not listed as hazardous; however, ethanol and acetic acid are both flammable and should not be used in air or on surfaces where the temperatures could exceed 28°C. Acetic Acid is also labeled as corrosive, volatile and extremely irritating to the eyes, nose and respiratory system. It is suggested that none of these solutions be applied with a sprayer since spraying increases the vapors. Dispose of unused solution in the proper chemical disposal container. Do not pour any remaining solutions back into their original bottles.

9.14.4 Reagent Preparation

**Acid Yellow Fixing Solution**

<table>
<thead>
<tr>
<th>Chemicals</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-Sulfosalicylic Acid</td>
<td>Balance</td>
</tr>
<tr>
<td>Distilled water</td>
<td>Graduated cylinder</td>
</tr>
<tr>
<td></td>
<td>Glass beaker</td>
</tr>
<tr>
<td></td>
<td>Magnetic stir rod</td>
</tr>
<tr>
<td></td>
<td>Clear storage bottle</td>
</tr>
</tbody>
</table>

**Mixing Instructions**

<table>
<thead>
<tr>
<th>1 Liter</th>
<th>Chemical</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 g</td>
<td>5-Sulfosalicylic Acid</td>
</tr>
<tr>
<td>1 L</td>
<td>Distilled water</td>
</tr>
</tbody>
</table>

Weigh out the acid and place in a clean, dry beaker. Add the measured amount of water and add to the beaker. Stir with stir rod until completely dissolved. Store the Fixing Solution in a labeled, clean glass bottle.

Shelf Life: 6 months.

**Disposal Instructions**

See Appendix F

**Acid Yellow Working Solution**

<table>
<thead>
<tr>
<th>Chemicals</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acid Yellow</td>
<td>Balance</td>
</tr>
<tr>
<td>Acetic acid</td>
<td>Graduated cylinder</td>
</tr>
<tr>
<td>Ethanol</td>
<td>Glass beaker</td>
</tr>
<tr>
<td>Distilled water</td>
<td>Magnetic stir rod</td>
</tr>
<tr>
<td></td>
<td>Clear storage bottle</td>
</tr>
</tbody>
</table>

**Mixing Instructions**

<table>
<thead>
<tr>
<th>1 Liter</th>
<th>2 Liters</th>
<th>4 Liters</th>
<th>Chemical</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 g</td>
<td>2 g</td>
<td>4 g</td>
<td>Acid Yellow</td>
</tr>
<tr>
<td>50 mL</td>
<td>100 mL</td>
<td>200 mL</td>
<td>Acetic acid</td>
</tr>
<tr>
<td>250 mL</td>
<td>500 mL</td>
<td>1000 mL</td>
<td>Ethanol</td>
</tr>
<tr>
<td>700 mL</td>
<td>1400 mL</td>
<td>2800 mL</td>
<td>Distilled water</td>
</tr>
</tbody>
</table>
Weigh out the Acid Yellow and place in a clean, dry beaker. Add measured acetic acid, ethanol, and water to beaker. Stir with a magnetic stirrer approximately 30 minutes. Transfer the Working Solution into a labeled, clean glass bottle.

Shelf Life: 6 months.

**Disposal Instructions**

See Appendix F

**Acid Yellow Wash**

<table>
<thead>
<tr>
<th>Chemicals</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetic acid</td>
<td>Graduated cylinder</td>
</tr>
<tr>
<td>Ethanol</td>
<td>Glass beaker</td>
</tr>
<tr>
<td>Distilled water</td>
<td>Magnetic stir rod</td>
</tr>
<tr>
<td></td>
<td>Clear storage bottle</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mixing Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chemical</strong></td>
</tr>
<tr>
<td>Acetic acid</td>
</tr>
<tr>
<td>Ethanol</td>
</tr>
<tr>
<td>Distilled water</td>
</tr>
</tbody>
</table>

Combine the measured amounts of the acid, ethanol and water in a clean beaker and mix. Store the Wash Solution in a labeled, clean glass bottle.

Shelf Life: 6 months.

**Disposal Instructions**

See Appendix F

9.14.5 References

9.15 **Crystal (Gentian) Violet**

9.15.1 Purpose

Crystal (gentian) violet is used to develop ridge detail on the adhesive surface of tape (not to be used on water soluble tape). Crystal violet stains the sebaceous material in latent print residue, causing the latent print to turn a dark purple.

If the non-adhesive surface of the tape is also being processed for latent prints, cyanoacrylate ester fuming should be done prior to the application of crystal violet.

9.15.2 Method

Dip tape into crystal violet solution and soak for 1 to 2 minutes. Rinse with cold tap water and allow evidence to dry. A control print is to be tested at the time of use to ensure the crystal violet is working properly. Any latent prints suitable for recovery developed or enhanced by crystal violet will be photographed.

9.15.3 Safety

Crystal violet is toxic and should be handled with care. Use appropriate personal protective equipment when preparing or applying crystal violet. Dispose of unused solution in the proper chemical disposal container.

9.15.4 Reagent Preparation

<table>
<thead>
<tr>
<th>Chemicals</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crystal violet crystals</td>
<td>Balance</td>
</tr>
<tr>
<td>Distilled water</td>
<td>Glass beaker</td>
</tr>
<tr>
<td></td>
<td>Magnetic stir rod</td>
</tr>
<tr>
<td></td>
<td>Clear or amber storage bottle</td>
</tr>
</tbody>
</table>

**Mixing Instructions**

<table>
<thead>
<tr>
<th>Chemical</th>
<th>0.5 Liter</th>
<th>1 Liter</th>
<th>2 Liters</th>
<th>Chemical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crystal violet crystals</td>
<td>0.5 g</td>
<td>1 g</td>
<td>2 g</td>
<td>Crystal violet crystals</td>
</tr>
<tr>
<td>Distilled water</td>
<td>500 mL</td>
<td>1000 mL</td>
<td>2000 mL</td>
<td>Distilled water</td>
</tr>
</tbody>
</table>

Combine crystals and water and stir until dissolved (approximately 25 minutes). Store in a clear or amber storage bottle.

Shelf life: Three years (laboratory default expiration).

**Disposal Instructions**

See Appendix F

9.15.5 References

9.16 Small Particle Reagent (SPR)

9.16.1 Purpose

Small Particle Reagent is a manufacturer-prepared reagent that comes in both a white and dark color. SPR may be used to develop latent prints on non-porous surfaces that have been wet. White SPR should be used on dark-colored surfaces; dark SPR should be used on light-colored surfaces.

9.16.2 Method

1. Shake the container of SPR vigorously to blend contents (powder suspended in detergent solution)
2. A control print is to be tested at the time of use to ensure the SPR is working properly.
3. Spray the area of item under examination, starting at the top and working downward
4. If latent prints appear, continue spraying the relevant area until there is no further development of the latent print with the grey or white powder
   a. If the latent print(s) appear over-developed, spray tap water above the region of latent prints, allowing the water to cascade over the latent prints. This will wash away excess powder. Do not spray water directly on the latent prints.
   b. If the latent prints appear underdeveloped, repeat the treatment.
5. Allow the surface to dry
6. Any latent prints suitable for recovery developed or enhanced by SPR will be photographed.

9.16.3 Safety

Small Particle Reagent is considered non-hazardous; however, use appropriate personal protective equipment when preparing or applying SPR. Dispose of unused solution in the proper chemical disposal container.

Disposal Instructions

See Appendix F

9.16.4 References

- Sirchie. Technical Information: Small Particle Reagent 2011

Website last accessed 5/8/18:

http://d1zh4ok0q8k7dm.cloudfront.net/media/resourcecenter/item/s/p/spr100_ti02-29eng-rev7e.pdf
9.17 Wetwop™

9.17.1 Purpose

Wetwop™ is used to recover friction ridge detail from the adhesive side of tapes and other adhesive-backed materials. The manufacturer’s recommended procedures should be followed.

If the non-adhesive surface of the tape is also being processed for latent prints, cyanoacrylate ester fuming should be done prior to the application of Wetwop™.

9.17.2 Method

Use a brush to paint the solution onto the adhesive surface of the tape and allow Wetwop to set for 30 - 60 seconds. Rinse solution from tape with a slow stream of cold tap water and allow tape to dry (see “Safety” below). Repeat steps if needed. Any latent prints suitable for recovery developed or enhanced by Wetwop will be photographed.

A control print is to be tested at the time of use to ensure the Wetwop is working properly.

9.17.3 Safety

Use appropriate personal protective equipment when preparing or applying SSP or Wetwop.

There are two waste buckets for capturing the rinse for Wetwop. Bucket #1 contains a large funnel and Bucket #2 contains a 4 liter bottle.

1. Open both buckets
2. Remove the large funnel from Bucket #1 and place it inside the 4L bottle in Bucket #2
3. After applying the Wetwop, suspend the evidence over Bucket #1 and rinse with water (typically using a squirt bottle)
4. After the rinse is complete, slowly pour the rinse in Bucket #1 into the bottle in Bucket #2 via the funnel. Rinse the bottom of Bucket #1 and pour into the bottle in Bucket #2 via funnel.
5. Store the funnel in Bucket #1
6. Cap the 4L bottle in Bucket #2
7. Replace both bucket lids

9.17.4 References

- Champod, Christophe; Lennard, Chris; Margot, Pierre & Stoilovic, Milutin, Fingerprints and other Ridge Skin Impressions, CRC International Forensic Science and Investigation Series, CRC Press 2004
9.18 Validation of Latent Print Development Techniques

New development techniques or methods used by the Latent Print Detail must first be tested on non-evidentiary material and reviewed by the laboratory Quality Assurance Manager prior to applying the method to actual case evidence (Laboratory validation procedures are outlined in the LVMPD Forensic Laboratory Quality Manual).
LVMPD FORENSIC LABORATORY
TECHNICAL PROCEDURES
LATENT PRINT DETAIL

10.0 Title: Quality Control Plan

10.1 General Calibration and Maintenance

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Frequency</th>
<th>Criteria</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fume Hoods</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LP # 3</td>
<td>External:</td>
<td>Meet external vendor criteria</td>
<td>If a fume hood is not operating properly:</td>
</tr>
<tr>
<td>Model: Protector</td>
<td>Annually</td>
<td></td>
<td>1. Tag out of use</td>
</tr>
<tr>
<td>Serial# 050639188H</td>
<td>For annual</td>
<td>Vendor certifications are kept for all fume</td>
<td>2. Advise lab manager.</td>
</tr>
<tr>
<td>(LVMPD# 51682)</td>
<td>certification:</td>
<td>hoods in the Resource Manager in LIMS.</td>
<td></td>
</tr>
<tr>
<td>LP # 4</td>
<td>Vendor Options:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model: Protector</td>
<td>Controlled</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serial# 050639180H</td>
<td>Environment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(LVMPD# 51683)</td>
<td>Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LP # 5</td>
<td>For repairs and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model: Purifier</td>
<td>maintenance:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serial# 050638755B</td>
<td>Vendor options:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(LVMPD# 51684)</td>
<td>Thomas and Mack</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>896-7035</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Microscopes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leica GZ6 Stereoscope</td>
<td>External:</td>
<td>Meet external vendor criteria</td>
<td>If a microscope is not operating properly:</td>
</tr>
<tr>
<td>(LVMPD# 0GUG)</td>
<td>Annually</td>
<td></td>
<td>1. Tag out of use</td>
</tr>
<tr>
<td>No serial number</td>
<td>Vendor options:</td>
<td></td>
<td>2. Advise lab manager.</td>
</tr>
<tr>
<td></td>
<td>McBain Systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(805) 581-6800</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Western Scientific Company, Inc. (WESCO)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(661) 295-5040</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hygrometer</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VWR Traceable Hygrometer</td>
<td>External:</td>
<td>Meet external vendor criteria</td>
<td>If a hygrometer is not operating properly:</td>
</tr>
<tr>
<td>Thermometer Dewpoint</td>
<td>Every two years by Control Company</td>
<td></td>
<td>1. Tag out of use</td>
</tr>
<tr>
<td>S/N = 80515749</td>
<td></td>
<td></td>
<td>2. Advise lab manager.</td>
</tr>
</tbody>
</table>

Uncontrolled Copy if not located in Qualtrax  Page 112 of 149
<table>
<thead>
<tr>
<th>Instrument</th>
<th>Frequency</th>
<th>Criteria</th>
<th>Corrective Action</th>
</tr>
</thead>
</table>
| **Balance** | Internal: | The balance will be checked at three different weights representing high, medium and low ranges of the balance. The balance must meet external vendor criteria. Vendor certifications are kept in the Resource Manager in LIMS. | If a balance is not operating properly:  
1. Initiate manufacturer’s procedures to perform a mechanical internal calibration (if applicable) or external calibration.  
2. If the above steps do not correct the problem, tag out of use, advise the lab manager and prepare a Corrective Action Report, if necessary. |
| Denver Instrument XL3100 S/N = N0082888 LP#1 (LVMPD # 30858) | Monthly | Check with designated ASTM 1 weights per Balance Verification Log. Log is maintained in the Latent Print Development Lab. |  |
| | External: | |  |
| | Annually | |  |
| | Vendor options: Mettler-Toledo Inc. (800) 523-5123 | |  |
| | Precise Weighing Systems (661) 250-9044 | |  |
| **Pipette** | **External:** | LP 1 will be calibrated at 10 µL  
LP 2 will be calibrated at 100.00 µL, 500.00 µL and 1000.00 µL. | If a pipette is not operating properly:  
1. Tag out of use.  
2. Advise Quality Manager / designee who will arrange for repair. (Corrective Action Report not required for Latent Print pipettes because they are used as transferring devices). |
<p>| MLA 10µl Pipette S/N = M09310211 LP1 | Annually | Each pipette must meet external vendor criteria for accuracy and precision. |  |
| | Vendor options: Calibrate, Inc. (919) 240-4089 Quality Control Services, Inc. (800) 843-1237 Rice Lake / Heusser Newweigh, LLC. (925) 798-8900 Integrated Service Solutions 610-287-3433 | Vendor certifications are kept in the Resource Manager in LIMS. |  |
| Rainin 1000µl Pipette S/N = H92603 LP2 | | |  |</p>
<table>
<thead>
<tr>
<th>Instrument</th>
<th>Frequency</th>
<th>Criteria</th>
<th>Corrective Action</th>
</tr>
</thead>
</table>
| Caron CRSY102-1 Condensate Recirculator  
Serial # 072408-CRSY102-1-13Y | Annually - Install replacement filter kit for CRSY102 recirculator in December of each year.  
Kit must be ordered in July of each year – see order information in Resource Manager OR for the Water Recirculator.  
Fill water tank with distilled water.  
For repairs or maintenance:  
Warranty repair: Caron (Jim Lang)  
(740) 373-6809  
Other repairs: Source Refrigeration 453-2424 | Annual maintenance data is kept in the Resource Manager in LIMS. | If recirculator is not functioning properly:  
1. Tag out of use  
2. Document on Instrument Maintenance/Repair Log  
3. Advise lab manager. |
| Caron 6135 Chamber         | **Internal:** Semi-annually: Check temperature and relative humidity at listed criteria  
For repairs or maintenance:  
Warranty repair: Caron (Jim Lang)  
(740) 373-6809  
Other repairs: Source Refrigeration 453-2424 | 70°C (± 5°C) at 70% (± 15%) relative humidity  
Verification data is kept in the Resource Manager in LIMS. | If a chamber is not functioning properly:  
1. Tag out of use  
2. Document on Instrument Maintenance/Repair Log  
3. Advise lab manager. |
| Serial# 072408-6135-2-5  
(LVMPD# 10698)              |                                              |                                                                          |                                                                                   |
| Caron 6105 Chamber         |                                              |                                                                          |                                                                                   |
| Serial# 072408-6105-2-58   
(LVMPD# 10699)              |                                              |                                                                          |                                                                                   |
<table>
<thead>
<tr>
<th>Instrument</th>
<th>Frequency</th>
<th>Criteria</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cyanoacrylate Chambers</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Misonix CA-6000</td>
<td>Internal:</td>
<td>Relative Humidity: 80% (± 15%)</td>
<td>If a chamber is not operating properly:</td>
</tr>
<tr>
<td>Serial# CA02180904 (LVMPD# 50572)</td>
<td>Semi-Annually:</td>
<td>Verification data is kept in the Resource Manager in LIMS.</td>
<td>1. Tag out of use.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Document on Instrument Maintenance/Repair Log</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. Advise lab manager.</td>
</tr>
<tr>
<td>Foster + Freeman MVC 3000/D</td>
<td>Internal:</td>
<td>Relative Humidity: 80% (± 15%)</td>
<td>If a chamber is not operating properly:</td>
</tr>
<tr>
<td>Serial# 3763 (LVMPD 19769)</td>
<td>Semi-Annually</td>
<td>Verification data is kept in the Resource Manager in LIMS.</td>
<td>1. Tag out of use.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Document on Instrument Maintenance/Repair Log</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. Advise lab manager.</td>
</tr>
</tbody>
</table>
### ASTM-1

**Instrument**
- Rice Lake Weighing Systems
- ASTM 1 weights
- No serial number (for checking the balance in LP)

**External:**
- Annually
- Critical service

**Vendor options:**
- Rice Lake / Heusser
- Neweigh, LLC.
  - (925) 798-8900

**Frequency**
- External:
- Annually
- Critical service

**Criteria**
- Meet external vendor criteria.
- If the correction plus the uncertainty value for an individual weight is beyond the display resolution of the LP #1 balance, the weight will be considered passing.
  - Vendor certifications are kept in the Resource Manager in LIMS.

**Corrective Action**
- If a weight does not meet the criteria:
  1. Take the weight out of service, if necessary.
  2. Advise the lab manager and prepare a Corrective Action Report, if necessary.

---

**10.1.1 Procedure for Checking the Humidity in the Misonix CA Chamber**

1. Remove any residual CA from the hot plate at the base of the chamber.

2. Set the VWR “Traceable” humidity meter to read “RH” (relative humidity) by pressing hold button on front of meter.

3. Place entire meter inside the CA chamber so that display can be read through the glass door.

4. Hang sensor cord over the hanging bar at the top of the chamber so the sensor is suspended in the middle of the chamber.

5. Start CA fuming cycle* by pressing start button.

6. The humidity inside the chamber will increase until it reaches the programmed humidity. The chamber will then begin the fuming cycle. During the fuming cycle, the circulation fan will switch on and off every 10 seconds.

7. Take the relative humidity value from the meter after the humidity cycle has finished and when the circulation fan is not engaged.

8. Record the relative humidity reading in the appropriate form, “CA-6000 LVMPD 50572 Semi-Annual Maintenance and Verification”, located in Qualtrax. If the reading does not fall within established parameters, wait an hour and take the reading again. If the chamber still fails to meet the established parameters, turn off and restart the chamber and repeat the fuming cycle and measurement process. Document all attempts to verify the humidity. If the prior steps do not correct the problem, tag the chamber out of use and notify the lab manager.

9. Upload the completed CA-6000 LVMPD 50572 Semi-Annual Maintenance and Verification form to the appropriate Manage Files section in Resource Manager in LIMS: LVMPD Forensic Laboratory\Resources\Lab Equipment\Latent Print Detail\Cyanoacrylate Chambers\CA2
*Fuming cycle parameters used in casework will vary based on type of evidence and analyst discretion. The following fuming cycle parameters represent average values and can be used when checking humidity.*

Test Cycle Parameters:  
- Humidity: 80%
- Purge Time: 12 minutes
- Max Fume Cycle Time: 13 minutes
- Circulation Fan Setting: 10 seconds on/10 seconds off

### 10.1.2 Procedure for Checking the Humidity in the Foster + Freeman CA Chamber

1. Remove any residual CA from the hot plate at the base of the chamber.
2. Set the VWR “Traceable” humidity meter to read “RH” (relative humidity) by pressing hold button on front of meter.
3. Place entire meter inside the CA chamber so that display can be read through the glass door.
4. Hang sensor cord over the hanging bar at the top of the chamber so the sensor is suspended in the middle of the chamber.
5. Push the humidity button.
6. The humidity inside the chamber will increase until it reaches the programmed humidity. This will take ~ 15 minutes to reach. The chamber will then hold for ~ 15 minutes.
7. Take the relative humidity value from the meter after the 15 minutes hold period.
8. Push the purge button to do a mini purge to bring the RH temperature back down to normal. This should take ~5 minutes.
9. Record the relative humidity reading on the form, “MVC3000 LVMPD 19769 Semi-Annual Maintenance and Verification”, located in Qualtrax. If the reading does not fall within established parameters, wait an hour and take the reading again. If the chamber still fails to meet the established parameters, turn off and restart the chamber and repeat the fuming cycle and measurement process. If the prior steps do not correct the problem, tag the chamber out of use and notify the lab manager.
10. Upload the completed MVC3000 LVMPD 19769 Semi-Annual Maintenance and Verification form to the appropriate Manage Files section in Resource Manager in LIMS: LVMPD Forensic Laboratory\Resources\Lab Equipment\Latent Print Detail\Cyanoacrylate Chambers\CA3

### 10.1.3 Procedure for Checking the Humidity in the Environmental Chambers

1. Place sensor inside the environmental chamber being evaluated.
   
   When evaluating the small environmental chamber, suspend the humidity sensor inside the chamber using a clothes pin, keeping meter portion outside. The sensor cord will lie between the door seals when the door to the chamber is closed. When evaluating the large chamber, thread the sensor through the opening in the side of the chamber. Plug the opening using the stopper with a hole cut for the sensor cord.

2. Turn on the environmental chamber. Set the temperature and humidity to test values.

3. Wait until the chamber has reached the required temperature and humidity as indicated by control panels on the front of the environmental chamber.

4. Set humidity meter to read only relative humidity by pressing hold button on front of the VWR “Traceable” humidity meter.
5. Read the humidity from the display on the front of the meter and record the value in the appropriate Semi-Annual Verification form (located in Qualtrax). If the reading does not fall within established parameters, wait an hour and take the reading again. If the chamber still fails to meet the established parameters, turn off and restart the chamber and repeat the cycle and measurement process. If the prior steps do not correct the problem, tag the chamber out of use and notify the lab manager.

6. Upload the completed Semi-Annual Verification form to the appropriate Manage Files section in Resource Manager in LIMS: LVMPD Forensic Laboratory\Resources\Lab Equipment\Latent Print Detail\Environmental Chambers

10.1.4 Procedure for Checking the Balance

1. Check the level bubble to ensure the balance is level with the surface.

2. Tare the balance.

3. Wearing cotton gloves, place appropriate weights on the balance to reach the desired weight level (tare balance between each weight level) and document the displayed weight on the "Internal Monthly Calibration Check - Balance Verification Log".

4. If the balance is out of the range (ranges listed on the log), document the value and then perform a balance recalibration per the balance user’s manual. Check all weights a second time and record the new values on the log. If the balance is still out of range, take the balance out of service and notify the Forensic Laboratory Manager.

10.2 Safe Handling, Use, Transportation and Storage of Measuring Equipment

The Manufacturer’s Operating or Instruction Manual should be referred to when there are concerns about the handling, usage, transportation and storage of the balance or non-disposable pipettes. The balance and the pipettes are not transported outside the laboratory.

Glassware used for measuring will be handled with appropriate personal protective equipment. It will be clean and inspected for cracks or chips prior to use. If glassware is deemed unsuitable for use, it will be disposed of in an appropriate glass receptacle. Glassware is not transported outside the laboratory.

ASTM-1 weights will be handled with cotton gloves to minimize moisture and oil from coming in contact with each weight. Smaller mass weights will be handled with the plastic tweezers provided by the manufacturer. The weights will be stored in the latent print development laboratory in the original manufacturer’s container and placed in a designated cabinet. The ASTM-1 weights will only be transported outside the laboratory to an approved external vendor for calibration. During transport, the weights will be stored in the original manufacturer’s container and sent via the approved external vendor recommendations.

The hygrometer is used to perform the calibrations of the cyanoacrylate and environmental chambers. The use of the hygrometer for the calibration checks are detailed in this manual. General instructions for use are detailed in the manufacturer’s instructions stored in the case with the hygrometer. If the hygrometer is dropped or appears damaged, it will be taken out of service until it can be repaired or replaced. The hygrometer is stored in its protective case when not in use. The hygrometer is shipped out of the laboratory every two years for calibration. The
hygrometer will be shipped in its protective case and surrounded by cushioned packaging material.

**NIST Traceable Rulers** will be handled with care. Do not bend or twist the rulers, and do not use them for any purpose other than taking measurements or checking measurement devices. Any activity which may damage or affect the accuracy of a NIST Traceable Ruler will be reported to the Latent Print Detail Manager, the Firearms and Tool Marks Detail Manager, or, or the respective designee.

### 10.3 Instrument Maintenance, Verification, and Repairs – Documentation

Documentation of routine internal maintenance and verification checks take place on the following forms in Qualtrax (LVMPD\Forensic Lab Forms\Latent Prints\Equipment Maintenance and Calibration):

- **Balance**
  
  Balance Verification Latent Prints

- **CA Chambers**
  
  MVC3000 LVMPD 19769 Semi-Annual Maintenance and Verification
  
  CA-6000 LVMPD 50572 Semi-Annual Maintenance and Verification

- **Environmental Chambers**
  
  Caron 6105 LVMPD 10699 Semi-Annual Verification
  
  Caron 6135 LVMPD 10698 Semi-Annual Verification
  
  Caron Condensate Recirculator Annual Maintenance

Additional maintenance or repair of equipment or instruments will take place on an “Instrument Maintenance-Repair” log
### 10.4 Computer Software Versions

<table>
<thead>
<tr>
<th>Instrument/Workstation</th>
<th>Software Version</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Desktop</strong></td>
<td></td>
</tr>
<tr>
<td>Adobe Photoshop CC</td>
<td>Version: 2017.0.1 release 20161130.r.29 x64</td>
</tr>
<tr>
<td>Adobe Bridge CC</td>
<td>Version: 2017 release – 7.0.0.93 x64</td>
</tr>
<tr>
<td>Adobe Photoshop Camera Raw</td>
<td>Version: 9.8.0.692 (Plug-in for Photoshop CC)</td>
</tr>
<tr>
<td>Adobe Photoshop CS6</td>
<td>Version: 13.0.1 x32 &amp; 13.0.1 x64</td>
</tr>
<tr>
<td>Adobe Bridge CS6</td>
<td>Version: 5.0.2.4 x 64</td>
</tr>
<tr>
<td>Adobe Photoshop Camera Raw</td>
<td>Version: 9.1.1.461 (Plug-in for Photoshop CS6)</td>
</tr>
<tr>
<td>Adobe DNG Converter</td>
<td>Version: 11.2.0.135</td>
</tr>
<tr>
<td><strong>AFIS</strong></td>
<td></td>
</tr>
<tr>
<td>NEC MBIS</td>
<td></td>
</tr>
<tr>
<td>iESB</td>
<td>Version: v20190425.8</td>
</tr>
<tr>
<td>IBW</td>
<td>Version: 4.3.140.0</td>
</tr>
<tr>
<td>Integra ID Archive</td>
<td>Version: 4.1.65</td>
</tr>
<tr>
<td>NGI (FBI database)</td>
<td></td>
</tr>
<tr>
<td>ULW 2017 – Universal Latent Workstation Version</td>
<td>6.6.7</td>
</tr>
<tr>
<td>Latent Mailer</td>
<td>Version: N/A</td>
</tr>
<tr>
<td>uPrint</td>
<td>Version: 1.0</td>
</tr>
<tr>
<td><strong>Sciometrics Workstation</strong></td>
<td>Sciometrics LatentSleuth</td>
</tr>
<tr>
<td><strong>Cameras</strong></td>
<td></td>
</tr>
<tr>
<td>Hyper-Utility Software HS-V5</td>
<td>Version: 1.1</td>
</tr>
<tr>
<td>Hyper-Utility3</td>
<td>Version: 3.1.0.0</td>
</tr>
</tbody>
</table>
Appendix A  Title: Administrative AFIS Criteria

Scope

This appendix provides the minimum criteria for determining whether or not a latent print is AFIS quality. AFIS quality means that the latent print contains the appropriate information that will maximize AFIS’s ability to search and provide the closest matching candidates based on the system’s algorithm. Fingerprints or palm prints that appear to have come from a child will not be searched through AFIS.

Per the NEC “Latent Examiners Reference”, the matching accuracy of the database relies on the following:

- Minutia marked correctly in the latent
- Correct direction of minutia marked
- Correct ridge counts
- Core and axis placement correct (fingers only)
- Correct zoning
- Pattern and finger number entered correctly (fingers only)
- Robust database of exemplar prints

Per the NEC “Latent Examiners Reference” (2016), factors contributing to a “miss” (false negative search) in the database include:

- Poor database quality print
- Poor quality latent print
- Incorrect minutia placement
- Incorrect core and axis placement
- Poor zoning
- Low number of minutia marked in the search print
- Insufficient number of candidates checked
- Incorrectly calibrated image (IBW needs 1:1)

1 AFIS Quality Fingerprints

The following criteria will be used to determine AFIS quality fingerprints for the Administrative AFIS Program. The purpose of these criteria is not to restrict the analysts from searching latent prints that do not meet the criteria. This serves as a guideline to keep the Administrative AFIS Program efficient.

A. The pattern type is determinable within one reference pattern.
B. The core and axis are determinable. Axis placement is more critical than core placement. The axis should be set to a 30° search tolerance and be zero vertical offset (see C below).

- Local AFIS (IBW) latent fingerprint searches use core and axis for the initial search through the database, but an automatic 360° search within the top 255 candidates is performed if ELFT secondary matching is selected.
- ELFT will be used for latent finger searches through the local database; IBW software is defaulted for ELFT secondary matching
- ESSO (WIN, CA DOJ, and NGI via IBW) latent fingerprint searches default to a 30° search tolerance.
- ULW latent fingerprint search tolerance is defaulted to 30° for image searches (LFIS) and feature searches (LFFS). The search tolerance for LFFS can be edited (LFIS must be searched “Fingertip Up” at 30°).

C. The latent print should be captured in the distal orientation with no skew (rotation) to the axis.

- This is particularly important for CA DOJ latent fingerprint searches (if performed) because the CA DOJ system does not use the ELFT secondary matching at this time.
- Zero skew also places the images in the upright orientation for TLI review.
- Zero skew is accomplished in the NEC IBW software by moving the crop box over the latent of choice on the evidence image and rotating the crop box to orient the preview image of the latent print.
- For NGI searches via ULW, orient the image in Photoshop prior to cropping and importing into the ULW software. This must be done for LFIS and is optional for LFFS (see below). LFIS orientation can be adjusted in Latent Editor; Note: To reduce file size, only rotate an image once in Latent Editor. Undo the rotation (Ctrl-Z) and rotate again until the desired angle is obtained.
- If using the LFFS search in ULW, rotation and cropping can take place in Latent Editor. Note: To reduce file size, only rotate an image once in Latent Editor. Undo the rotation (Ctrl-Z) and rotate again until the desired angle is obtained.

D. There is a minimum of eight (8) encodable minutia in a contiguous region. These minutia should be easily discernable in the latent print to ensure accuracy in placement and direction. Zone out areas that may contain minutia you did not mark (e.g. unclear areas).

E. The following ridge detail should not be counted as encodable minutia if they create overlapping minutia markers: short ridges (less than two ridge widths); small islands (less than two ridge widths); complex areas with numerous minutia; and thin or incipient ridges.

F. Do not encode minutia created by a scar. Zone the scar out and chose one or more contiguous region of ridge detail for separate searches.

G. Friction Ridge impressions with white ridges should be inverted and searched and registered with black ridges.

H. Trimmed or binary images created with IBW filters or enhancements will not be registered in the database.

- NEC IBW software sometimes performs better on low contrast images using enhancements that create a trimmed and binary image. These filters cause significant digital distortion in the print and can crop out important surrounding ridge information (e.g. a pattern or ridge count). The digital distortion can cause
difficulty during the candidate list review because the original, unenhanced image cannot be viewed on the verification screen for an LI or TLI.

- While an initial search can be performed using these enhancement tools, registered latent prints must contain the full one inch square image with proper zoning that isolates the region of interest for the search and must have sufficient grey scale values (not binary images). NOTE: TLI’s for latent fingerprints do not use the ELFT secondary matching (only during forward LI searches).
- If the IBW software is unable to auto-extract minutia on a low contrast image, it is recommended to enhance the image in Photoshop prior to uploading the image into AFIS (rather than using the IBW enhancement tools).

I. Latent fingerprints will be edited as follows:
   - IBW software – zone, core, axis, minutia, ridge counts, and pattern
   - ULW software
     - Image Only (LFIS) searches do not require editing
     - Image Only searches can be performed first, followed by a Quick Minutia search if the LFIS does not hit
     - Minimal Mark-up (LFFS) permits editing of orientation, region of interest, cores and deltas
     - If there are multiple impressions in the capture region, Minimal Mark-up should be used to isolate a particular latent print
     - Quick Minutia (LFFS) permits full encoding
     - Encoding ambiguous minutia is more effective for the matcher than missing true minutia

J. Latent fingerprints will be scanned at 1000 ppi for IBW and ULW software.
K. ULW - Civil File and Criminal Master File should always be selected; this is selected by default.

2 AFIS Quality Palm Prints

The following criteria will be used to determine AFIS quality palm prints for the Administrative AFIS Program. Again, the purpose of these criteria is not to restrict the analysts from searching latent prints that do not meet the criteria. This serves as a guideline to keep the Administrative AFIS Program efficient.

A. The distal orientation of the palm is determinable. Latent palms should be searched with a 60° search tolerance for local and ESSO searches (if ESSO performed).
B. If the palm does not hit in the local AFIS at 60°, a second local AFIS search should be performed at 360° search tolerance.
   - Unlike fingers, local latent palm searches do not undergo ELFT secondary matching in the IBW software.
   - If performed, ESSO latent palm searches to WIN and CA DOJ must have a 60° search tolerance. If greater tolerance is needed, the latent palm print must be rotated and searched at the needed angles as new Latent Inquiries.
ULW latent palm print search tolerance is defaulted to 30° for image searches (LFIS) and feature searches (LFFS). The search tolerance for LFFS can be edited (LFIS must be searched “Fingertip Up” at 30°).

C. The latent print should be captured in the distal orientation with no skew (rotation) to the axis.
   - Zero skew places the images in the upright orientation for TLI review.
   - Zero skew is accomplished in the NEC IBW software by moving the crop box over the latent of choice on the evidence image and rotating the crop box to orient the preview image of the latent print.
   - For NGI searches via ULW, orient the image in Photoshop prior to cropping and importing into the ULW software. This must be done for LFIS and is optional for LFFS (see below). Both LFIS and LFFS images may be rotated in Latent Editor.
   - Note: To reduce file size, only rotate an image once in Latent Editor. Undo the rotation (Ctrl-Z) and rotate again until the desired angle is obtained.
   - If using the LFFS search in ULW, rotation and cropping can take place in Latent Editor.

D. Minimum of 12 clear and encodable minutia in a contiguous region. These minutia should be easily discernable in the latent print to ensure accuracy in placement and direction. Zone out areas that may contain minutia you did not mark (e.g. unclear areas).

E. The following ridge detail should not be counted as encodable minutia if they create overlapping minutia markers: short ridges (less than two ridge widths); small islands (less than two ridge widths); complex areas with numerous minutia; and thin or incipient ridges.

F. Do not encode minutia created by a scar. Zone the scar out and chose one or more contiguous region of ridge detail for separate searches.

G. Avoid searching crease-riddled palms as they generate poor algorithms.

H. Palm and Palm Regions
   - IBW Software
     - Include right or left hand whenever possible.
     - For writer’s palms, search the hand and the associated writer’s palm.
   - ULW Software
     - Include right or left hand and anatomical region

I. For local palm registration, register as the specific hand (if known) with 60° search tolerance.

J. Friction Ridge impressions with white ridges should be inverted and searched and registered with black ridges.

K. Trimmed or binary images created with IBW filters or enhancements will not be registered in the database.
   - NEC IBW software sometimes performs better on low contrast images using enhancements that create a trimmed and binary image. These filters cause significant digital distortion in the print and can crop out important surrounding ridge information (e.g. a pattern or ridge count). The digital distortion can cause difficulty during the candidate list review because the original, unenhanced image cannot be viewed on the verification screen for an LI or TLI.
   - While an initial search can be performed using these enhancement tools, registered latent prints must contain the full one inch square image with proper
zoning that isolates the region of interest for the search and must have sufficient grey scale values (not binary images).

- If the IBW software is unable to auto-extract minutia on a low contrast image, it is recommended to enhance the image in Photoshop prior to uploading the image into AFIS (rather than using the IBW enhancement tools).

L. Latent palm prints will be edited as follows:

- IBW software – zone, axis, minutia, and ridge counts
- ULW software
  - Image Only (LFIS) searches do not require editing
    - Image Only searches can be performed first, followed by a Quick Minutia search if the LFIS does not hit
  - Minimal Mark-up (LFFS) permits editing of orientation and region of interest (do not mark cores and deltas)
    - If there are multiple impressions in the capture region, Minimal Mark-up should be used to isolate a particular latent print
  - Quick Minutia (LFFS) permits full encoding
    - Encoding ambiguous minutia is more effective for the matcher than missing true minutia

M. Latent palm prints will be scanned at 1000 ppi for IBW and ULW software.

N. ULW – Civil File and Criminal Master File should always be selected; this is selected by default.
Scope

This appendix provides language for reporting conclusions.

1 Identification

The report will reflect the anatomical region and the name of the person identified.

Example: A – Identified to the right index finger of John DOE.

2 Exclusion

The report will reflect the name(s) of the individual(s) excluded from the print.

Example: A – John DOE and Jane DOE were excluded.

3 Inconclusive

The report will reflect the name(s) of the individual(s) that were compared with inconclusive results and the reason for the inconclusive result.

Example: A – Inconclusive to Jane DOE and John DOE due to the poor quality and limited quantity of the detail in the latent print; no conclusions could be rendered.

4 Incomplete

The report will reflect the name(s) of the individual(s) compared with incomplete results, whether or not any detail was found in agreement, and any additional exemplars needed for comparison.

Examples: A – The comparison to Jane DOE was incomplete. Limited detail was found in agreement with Jane DOE; additional exemplars may result a definitive conclusion.

B – The comparisons to Jane DOE and John DOE were incomplete. No detail was found in agreement with Jane DOE or John DOE; additional exemplars may result in definitive conclusions.
5 Cannot exclude

The report will reflect the name(s) of the individual(s) that could not be excluded, that detail was found in agreement, and the reason a definitive conclusion could not be rendered.

Example: A – Jane DOE could not be excluded. Detail was found in agreement with the right index finger of Jane DOE; however, the quantity or quality of the detail in the latent print was insufficient to render a definitive conclusion.

6 Not compared

The report will reflect the names of the individuals that were not compared and indicate the reason.

Example: A – John DOE and Jane DOE were not compared; no palm exemplars available.

7 Not suitable

The report will reflect if an annotated latent print (a print that was initially determined to be suitable and was assigned a lab number and latent designator) has been determined to be unsuitable for comparison.

Example: A – Not suitable for comparison.

8 AFIS

The report will reflect the results of AFIS searches, the database(s) searched, and if the latent print was registered.

Examples: A – John DOE and Jane DOE were excluded. Searched through LVMPD AFIS database with negative results and registered in the database.

B – Searched through LVMPD AFIS database with negative result. Searched through FBI database with positive results; identified to the left middle finger of Bob SMITH.

9 Suitable Latent Prints

For each lift card and photograph (excluding duplicates), the number of suitable latent prints will be indicated.

Example: Five suitable latent prints marked A – E.

If there are no suitable latent prints on a lift card or photograph, the lift card will be reported as such.

Example: No suitable latent prints.

10 Additional exemplars

Whenever possible, the following standardized language should be used when requesting additional exemplars (descriptions included):

- Fingerprints
- Description: A set of standard fingerprints or a 10-print card is needed to complete the comparison

- Palms
  - Description: A set of standard, flat palm prints, both left and right, are needed to complete the comparisons

- Hypothenar area of the palm, including the writer’s palm
  - Description: The hypothenar region of the palm and writer’s palm area is needed to complete the comparisons, indicate left or right if possible

- Thenar area of the palm
  - Description: Thenar region, to include the thumb bracelet and outer edge of the thenar

- Interdigital area of the palm
  - Description: Interdigital region, to include the proximal phalangeal creases is needed to complete the comparisons

- Thenar web area of the palm
  - Description: Web area between the thumb and index finger is needed to complete the comparisons

- Thenar, hypothenar, and wrist bracelet of the palm
  - Description: Base area of the palm is needed to complete the comparisons

- Complete recording of all ridge detail of the palms
  - Description: Three regions of the palm, to include writer’s palm, thumb bracelet, wrist bracelet, and proximal phalangeal creases are needed to complete the comparisons

- Tips of the fingers
  - Description: Extreme tips of the distal phalanges are needed to complete the comparisons

- Edges of the fingers
  - Description: Extreme edges of the distal phalanges are needed to complete the comparisons

- Medial and proximal phalanges
  - Description: Lower segments of the fingers are needed to complete the comparisons

- All deltas of the fingers and palms
  - Any deltas present on the fingers or palms are needed to complete the comparisons

- Major case prints
  - Description: A complete recording of all friction ridge detail on the hands is needed to complete the comparisons

- Foot prints
  - Description: A complete recording of all friction ridge detail on the feet is needed to complete the comparisons
## Appendix C  Title: Abbreviations

### Scope

This appendix provides the definitions of abbreviations used by the analysts of the Latent Print Detail. The abbreviations may occur in any combination of lower case and upper case letters, and with or without a period (.)

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td>Administrative AFIS</td>
</tr>
<tr>
<td>AB</td>
<td>amido black</td>
</tr>
<tr>
<td>ABLS</td>
<td>Apparent blood-like substance</td>
</tr>
<tr>
<td>ACE</td>
<td>Active Control of Evidence</td>
</tr>
<tr>
<td>ACE-V</td>
<td>Analysis, Comparison, Evaluation and Verification</td>
</tr>
<tr>
<td>AFIS</td>
<td>Automated Fingerprint Identification System</td>
</tr>
<tr>
<td>AKA</td>
<td>Also Known As</td>
</tr>
<tr>
<td>ALS</td>
<td>alternate light source</td>
</tr>
<tr>
<td>ARCV</td>
<td>ACE “Archive” location for latent prints in storage room</td>
</tr>
<tr>
<td>AY7</td>
<td>Acid Yellow 7</td>
</tr>
<tr>
<td>BMP</td>
<td>black magnetic powder</td>
</tr>
<tr>
<td>BP</td>
<td>black powder</td>
</tr>
<tr>
<td>BSI</td>
<td>Biometric Set Identifier (FBI fingerprint and palm print records)</td>
</tr>
<tr>
<td>C#</td>
<td>Comparison case and total number of lift cards</td>
</tr>
<tr>
<td>CA</td>
<td>Cyanoacrylate</td>
</tr>
<tr>
<td>CA - DOJ</td>
<td>California Department of Justice</td>
</tr>
<tr>
<td>CAL ID</td>
<td>California Identification (the CA Department of Justice AFIS program)</td>
</tr>
<tr>
<td>cal.</td>
<td>Calibrated (image-related) or Caliber (firearms-related)</td>
</tr>
<tr>
<td>CAP</td>
<td>Crimes against persons</td>
</tr>
<tr>
<td>Capt. Req.</td>
<td>Captain’s Request</td>
</tr>
<tr>
<td>CS#</td>
<td>SCOPE identifier number</td>
</tr>
<tr>
<td>CSA</td>
<td>Crime Scene Analyst</td>
</tr>
<tr>
<td>CSI</td>
<td>Crime Scene Investigations</td>
</tr>
<tr>
<td>DA</td>
<td>District Attorney</td>
</tr>
</tbody>
</table>
LIMS Laboratory Information Management System
LL left little finger – also # 10
LM left middle finger – also # 8
LP left palm
LPP latent print packet (latent print package)
LR left ring finger – also # 9
LT left thumb – also # 6
MBIS Multi-Modal Biometric Identification System
MCP Major Case Prints
MF# Master File Number
MGW Molecular Grade Water
NDIA No detail in agreement
NGI Next Generation Identification (FBI database)
NIN Ninhydrin
NPPS National Palm Print System (FBI palm print database)
NR not registered
NVRD no visible ridge detail
OB OnBase
OR Object Repository (LIMS)
ORO Oil Red O
P Processing Case
P# Personnel Number (LVMPD)
PC Property Connect (LIMS)
PC Sgt. Property Crimes Sergeant
Photo (Photo’d) photography or photographed or photograph
pkg package
PD physical developer
PO Police Officer
POI Persons of Interest (LIMS)
PP palm print
PSR Police Service Representative
Reg or ® registered
R6G Rhodamine 6 G
RAM fluorescent dye stain
RD ridge detail
rec’d  received
rel’d  released
REMS  ACE “Remstar” location for latent prints
RFLE  Request for Forensic Laboratory Examination
RI  right index finger – also # 2
RL  right little finger – also # 5
RM  right middle finger – also # 3
RP  right palm
RR  right ring finger – also # 4
RT  right thumb – also #1
Rxn  reaction
S  suspect
SCSA  Senior Crime Scene Analyst
SBRV  San Bernardino/Riverside AFIS database
SDS  Safety Data Sheet
S/N  serial number
SID  state identification number
SN  silver nitrate
SOL  Statute of Limitations
SPC  special print card
SPR  small particle reagent
SSP  sticky side powder
TLI  Tenprint to Latent Inquiry (AFIS)
TLI Confirm  TLI Confirmation
TR  Technical Review
UCN  Universal Control Number (FBI term)
ULF  Unsolved Latent File (AFIS)
ULW  Universal Latent Workstation (NGI)
Unk  unknown
UR  Unit Record
V  victim
VEP  Victim Exemplar Prints
vis.  Visual or visible
VLT  ACE “vault” location for latent prints in the latent print evidence vault
WDIA  With detail in agreement
WIN  Western Identification Network
WP   white powder
WW   Wetwop
Appendix D  Title: Symbols

Scope

This appendix defines the symbols used by the analysts of the Latent Print Detail. The following symbols may be used in the case notes. Any additional symbols used by the analysts must be defined in the case notes.

\( \bigcap \) Latent Fingerprint or Toe Print (arch over distal end of print)

\( \cup \) Latent Palm or Foot Print (bracket encloses bottom of print area)

\[ \] Proximal or medial phalanx print (brackets along each side of area of interest)

\( \bigcirc \) Impression of unknown anatomical origin (circles latent print)

\( \bigtriangledown \) Verification
Appendix E  Title: Equipment Manuals

Scope

This appendix lists the equipment manuals for equipment currently in use by the Latent Print Detail. These manuals are maintained in the Latent Print Development Laboratory or in Qualtrax (LVMPD\Forensic Lab\Latent Prints) for reference purposes.

Camera

- Owner’s Manual for Fujifilm IS Pro, downloaded 2007
- Quick Start guide for Fujifilm IS Pro, downloaded 2007
- Owner’s Manual for Fujifilm XT-1, downloaded 2016
- New Features Guide for Fujifilm XT-1, downloaded 2016

Alternate Light Sources

- Spectrum 9000 Operating Instructions, 1997

Environmental Chambers

- Caron 6105 Fingerprint Development Chamber Operations Manual, 2008
- Caron 6100 Series Latent Print Development / Fingerprint Development Chamber, 2008

Cyanoacrylate Chambers

- Misonix Cyanoacrylate Fuming Chamber CA-6000 Operation Manual, 2008
- Foster + Freeman MVC 3000/D Cyanoacrylate Fuming Chamber Quick Start Guide, 2016
AFIS – NEC and ULW

NEC IBW – online access from AFIS workstations
NEC Archive – online access from AFIS workstations
NEC IBW Latent Quick Reference, 2016
NEC Biometrics Support Center Quick Reference, 2016
NEC Core Axis User Guide, 2010
NEC Latent Examiner’s Reference, 2016
FBI ULW Training Manual, 2014
FBI ULW Supplemental Training Version 6.4.1, 2014
FBI ULW NGI Best Practices, 2015
FBI Guidelines for Capturing Palm Prints and Supplementals, 2010

Sciometrics LatentSleuth

LatentSleuth Users Guide, March 2018

Miscellaneous

Purifier® HEPA Filtered Enclosures & Purifier® Class I Filtered Enclosures User’s Manual, 2004
Protector® Storage Cabinets User’s Manual, 1999
MLA Pipette Operators Manual, Rev D
Rainin Pipet-Plus, Rev J
Leica GZ6T Stereomicroscopes Instruction Manual, 1997
XL Series Balances Operating Instructions, Rev F
Traceable Humidity/Temperature Dew Point Meter Instructions, 2005
Coaxial Prism & Light Source Instructions, downloaded 2016
REMSTAR Operating Manual, 1996
Comparator (Sirchie) Technical Information, 2002
Appendix F  Title: Support Duties

Scope
The following appendix is a summary of the Lab Aide duties for the Latent Print Detail.

Glassware/Dishes:

All glassware used with reagents must be rinsed out with Methanol in a fume hood prior to taking the glassware to the sink to be washed. Dispose of the Methanol rinse into the proper waste bottle. Once rinsed with Methanol, transfer the glassware to the sink for washing. At the sink, wash and rinse with water and soap, then rinse with DI water. Perform a final rinse with Acetone and dispose of the Acetone rinse into the proper bucket (Acetone container on the sink). Allow the glassware/dishes to dry and put away in the proper place.

Ordering Supplies

The ordering spreadsheet is located H:\CB\Forensics\General\Ordering. Please make sure that you include the item number, vendor name, item description (please be as specific as possible), quantity, and requestor (your name). If ordering a chemical or common supplies, like gloves and weigh boats, please make sure that it is not in Dry Storage and that it does in fact need to be ordered. If you notice that a lab supply is getting low, or you take the last of any supplies in the supply room, please re-order it. The designated Lab Aide/designee will check the spreadsheet and will fill out the date ordered when they place the order. Butcher paper is ordered from Supply (by the roll) by putting it on the list of the mailroom clipboard.

When the order arrives, the designated Lab Aide/designee will need to log in the order and deliver to the detail.

Chemicals and Manufacturer-Prepared Reagents

SDS

When a chemical or manufacturer-prepared reagent is received, ensure the proper SDS exists. If not received with the chemical, the vendor's website must be checked for the appropriate SDS. Once the SDS is located for that chemical, it must be compared against what is on file in the H drive. If there is a new SDS, this must be added to the SDS folder on the H drive. [H:\CB\Forensics\General\Chemical Inventory (MSDS)/Latent Prints/SDS]. If replacing an SDS with a newer version or if a chemical is no longer being ordered and not currently in the lab, archive the old SDS by moving the outdated SDS to the folder marked "Archived" under the year that it is being archived.
If a new chemical is received or a chemical is received from a new manufacturer, notify the Latent Print Detail Safety Liaison or designee so that the new chemical can be added into the Chemical Inventory by the Safety Coordinator.

Lot Numbers

Lot numbers for chemicals and manufacturer prepared reagents stored in the Latent Print Detail will have suffix “-LP” added. For instance, if petroleum ether arrives with Lot# 7654321, it will be assigned and labeled “7654321-LP”. The same applies if chemicals are shared with the same lot number as another detail. For instance, if two bottles of isopropyl alcohol with Lot # 56789 are received and one goes to Seized Drugs and one goes to Latent Prints, the latent print lot number would be 56789-LP.

If a portion of a chemical is taken from a primary container in another Detail, “-LP” will be added to the end of the lot number. For instance, if a secondary container of Molecular Grade Water from DNA with lot number 123445 is taken to latent prints, our lot number will be “123445-LP”. The “received on date” will be the date the aliquot was obtained. The secondary container must be properly labeled. MGW labels are stored in the Chemicals and Reagents binder located in the processing lab. Additional labels can be printed from H:\CB\Forensics\General\LATENT PRINT DETAIL\Lab Tech Aide\Labels – Molecular Grade Water

If multiple bottles of a chemical with same lot number are received (e.g. two bottles of methanol with lot number 43567), the chemical is not archived in Resource Manager until all bottles are consumed.

If a chemical or manufacturer prepared reagent arrives without a lot number, it will be assigned one following lab policy and using the date received. For instance, if a new container of powder was received on February 14, 2016 and two other reagents had been prepared that day, the powder lot number would be LP021416-3. To determine the appropriate lot number, check the Reagent Log – Latent Prints in front of the Chemicals and Reagents binder located in the processing lab. Be sure to add the information for any lot numbers assigned in this manner to the Reagent Log – Latent Prints.

Labeling

Chemicals and manufacturer prepared reagents received and stored in the Latent Print Detail are labeled with the lot number, date received, date opened, and expiration date. This information will be recorded on a pre-printed label (“Chemical” label) affixed to all containers of chemicals received. If the chemical or manufacturer prepared reagent does not have an expiration date assigned by the manufacturer, it will be assigned a three year expiration from the date received.

Chemical labels are stored in the Chemicals and Reagents binder located in the processing lab. Additional labels can be printed from H:\CB\Forensics\General\LATENT PRINT DETAIL\Lab Tech Aide\Labels – Chemical

Quality Control Check – Manufacturer Prepared Reagents

Manufacturer prepared reagents require batch quality control (QC) checks (e.g. Cyanoacrylate ester, WetWop, powders). The result of the control check, the date of the QC check, and who performed the QC must be documented in Resource Manager, Resource Instance Details, General tab, Comments field. For Example, “QC+, 2/14/16, a1234z”
The container must be labeled with the result of the QC check. This information will be recorded on a pre-printed label ("Quality Control" label) affixed to all containers of manufacturer prepared reagents that require batch quality control check.

Quality Control labels are stored in the Chemicals and Reagents binder located in the processing lab. Additional labels can be printed from H:\CB\Forensics\General\LATENT PRINT DETAIL\Lab Tech Aide\Labels – Quality Control

Chemical Inventory and Resource Manager

When new chemicals or manufacturer prepared reagents arrive, the LIMS Resource Manager must be updated. The following fields must be completed in the Resource Instance Details, General tab:

- Lot#:
- Location:
  - See table below for location names
- Expiration Date:
- Manufacturer:
  - If the Manufacturer is not listed, email the LIMS Administrator to have it added.
- Description:
  - Indicate the chemical and quantity, e.g. “Methanol – 1L”
- Comments
  - If it is a manufacturer prepared reagent that requires batch quality control check, include the QC data in the Comments field (include QC result, date of QC, and who performed the QC)

The following naming convention will be used for the “Location” in Resource Manager:

<table>
<thead>
<tr>
<th>Location</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LP – Fridge</td>
<td>Refrigerator in the photography room</td>
</tr>
<tr>
<td>LP – Hood #5</td>
<td>Powder hood (#5) in processing lab</td>
</tr>
<tr>
<td>LP – Sink #1</td>
<td>Sink by the safety shower</td>
</tr>
<tr>
<td>LP – Sink #2</td>
<td>Sink by the environmental chambers</td>
</tr>
<tr>
<td>LP – Acid</td>
<td>Chemical cabinet under hood #4 labeled “Acids”</td>
</tr>
<tr>
<td>LP – Dry</td>
<td>Free standing chemical cabinet labeled “Dry Chemicals”</td>
</tr>
<tr>
<td>LP – Flammable</td>
<td>Free standing chemical cabinet</td>
</tr>
<tr>
<td>LP – Reagent</td>
<td>Chemical cabinet under hood #3 labeled “Reagent”</td>
</tr>
</tbody>
</table>

Instructions on how to create and archive chemicals in LIMS Resource Manager are in the Chemicals and Reagents binder.

Storage

The chemicals and manufacturer prepared reagents need to be stored properly at all times – bases with other bases (stored in Seized Drugs), acids in the acid cabinet, and flammables in the flammable cabinet.
Certain chemicals are located in Seized Drugs (the list is on the doors of each cabinet) and will need to be retrieved and returned with the rubber bucket.

**Quarterly Audit**

At the end of each quarter, an audit will be performed on the chemicals in the latent print unit to ensure the information is up to date. This includes labeling, expiration dates, LIMS Resource Manager, and SDSs. The audit will be documented on the “Chemical and Reagent Quarterly Audit” form and uploaded into Qualtrax Documents in the appropriate year folder under: Forensic Lab/Latent Prints/Chemical and Reagent Quarterly Audits.

**Lab Prepared Reagents**

Check all chemicals/stock reagents for expiration dates before making a reagent. Do not use chemicals or stock reagents that have expired. Expired chemicals and reagents must be properly disposed; re-order or make a new lot as needed. Reagents are prepared following the Latent Print Detail Technical Manual. Reagent preparation and quality control checks are documented on the individual *Reagent Preparation Logs* (templates stored in Qualtrax).

**Lot Numbers**

*Reagent Log – Latent Prints* (located in the *Chemicals and Reagents* binder on the shelf in the lab) tracks the lot numbers for reagents prepared by the Latent Print Detail. Reagents prepared for Crime Scene (CS) and Latent Prints (LP) are logged separately. If there are no more pages for the log book, blank logs are located in Qualtrax.

Occasionally a large volume of reagent may be made and split between Latents and CSI. The split will be indicated on the *Reagent Preparation Log* and in the Comments field of the Resource Instance Details, General tab in *Resource Manager*. For instance, if four liters of R6G is assigned lot# LP123116-1 and 2 liters is sent to the CSI section, the following note would be made on the *Reagent Preparation Log* and in the Comments field: “2L of R6G Working Solution split to CSI as LP123116-1-CS”

**Expiration Dates**

The expiration dates of reagents are based on the date the reagents are prepared, not the expiration dates of any of the individual chemical components. Expiration time frames for each reagent are indicated in the Latent Print Detail Technical Manual and on the *Reagent Preparation Logs*.

**Labeling**

*Identity and Hazard Label*

Reagent bottles are generally pre-labeled with the identity of the reagent and the hazard labels since the bottles are reused for the same reagents. If a new bottle is being used for a reagent, the identity of the reagent and hazard labels must be included on the new bottle.

*Reagent Preparation Label*
Reagents prepared in the lab must bear: Identity of the preparation, lot number, expiration date, storage conditions, GHS labels, and the initials of the person who prepared the reagent. This information will be documented on a pre-printed label (“Reagent Preparation” label) affixed to the container.

Reagent Preparation labels are stored in the Chemicals and Reagents binder located in the processing lab. Additional labels can be printed from H:\CB\Forensics\General\LATENT PRINT DETAIL\Lab Tech Aide\Labels – Reagent Preparation.

Labels generated from LIMS can also be used to label reagents.

Quality Control label

Reagents prepared in the lab that require batch quality control checks (e.g. R6G, Indanedione-Zn) will undergo a QC check as indicated in the Technical Manual. The result of the control check and who performed the QC is documented on the Reagent Preparation Logs.

The container must be labeled with the result of the QC check. This information will be recorded on a pre-printed label (“Quality Control” label) affixed to all containers of lab prepared reagents that require batch quality control check.

Quality Control labels are stored in the Chemicals and Reagents binder located in the processing lab. Additional labels can be printed from H:\CB\Forensics\General\LATENT PRINT DETAIL\Lab Tech Aide\Labels – Quality Control.

LIMS Resource Manager

The Resource Manager must also be updated. The following fields must be completed in the Resource Instance Details, General tab:

- Lot#:
- Date Created:
- Created by:
- Expiration Date:
- Description:
  - Indicate the chemical and lot#, e.g. “R6G Working Solution LP123116-1”
- Comments
  - If a lot of reagent is split with CSI, make a note of the quantity that went to CSI and the Lot #. For example: “2L of R6G Working Solution split to CSI as LP123116-1-CS”

If a lab prepared reagent is consumed or disposed of, it must be archived in Resource Manager.

Reagents prepared for CSI are immediately archived in Resource Manager.

Instructions on how to create and archive chemicals in Resource Manager are in the Chemicals and Reagents binder.
Storage

Reagents need to be stored properly at all times – non-acids in the reagent cabinet and acids in the acid cabinet.

Re-Stocking

If a frequently-used reagent in the latent lab is getting low (e.g. IND-ZN or R6G), please prepare a new lot. Infrequently used reagents can be prepared when needed for a specific case. The CSI section emails the Lab Aides or designees when the CSAs need more reagents.

Quarterly Audit

At the end of each quarter, an audit will be performed on the lab prepared reagents in the latent print unit to ensure the information is up to date. This includes labeling, expirations, and LIMS Resource Manager.

The audit will be documented on the “Chemical and Reagent Quarterly Audit” form and uploaded into Qualtrax Documents in the appropriate year folder under: Forensic Lab/Latent Prints/Chemical and Reagent Quarterly Audits.

Glass Disposal – Nonhazardous

Once the glass bin is full, tie the bag in a knot to seal it then place tape around knot. Replace the lid and seal the lid on with tape to ensure that it does not come open. Then dump box in the garbage dumpster out back. The new boxes are in the dry storage room and the assembly instructions are on the bottom of the box.

Biohazard Disposal

Biohazard disposal boxes are lined with red biohazard bags. When this bag is full, it must be properly disposed. Check with Toxicology’s contact to see when they are doing biohazard disposal (typically this will be done on a Thursday afternoon for pick up on Friday). Latent Prints’ bag is combined with Toxicology’s red biohazard bin.

At the end of June and end December, existing waste will be sent out and a new waste bag will be started.

Nonhazardous Waste Disposal

The Latent Print Detail generates both hazardous and nonhazardous waste. Nonhazardous waste includes but is not limited to liquid CA, fingerprint powders, small particle reagent (white and dark), and Wetwop. The Toxicology Detail houses drums for liquid nonhazardous waste and solid nonhazardous waste. There is a separate waste bucket in the Latent Print processing lab for Wetwop run-off.

Hazardous Waste Disposal

The Latent Print Detail generates both solid hazardous waste and liquid hazardous waste. Solid waste may take the form of a dry chemical that must be disposed of (e.g. a container of solid R6G). Items such as paper/glass/plastic that have been exposed to chemicals or are contaminated with small amounts of a chemical (e.g. disposable pipette used to measure liquid nitric acid) may be disposed of in the trash or
other appropriate method and do not need to be sent out with the hazardous waste. Small (4L or smaller) liquid waste bottles may be kept in Fume Hood #4. If a waste bucket is needed obtain a new one from the hazardous waste room.

Labeling

Each hazardous waste container must be properly labeled with the type of hazardous waste, the date waste collection started, and the date waste collection ended. Waste labels are stored in the Chemicals and Reagents binder located in the processing lab. Additional waste labels can be printed from H:\CB\Forensics\General\SAFETY DETAIL INFO\Safety\Waste Logs\LP. Prior to disposing of a mixed liquid waste bottle, the final pH must be determined and noted on the bottle as well as on the waste log. If a pH cannot be determined (i.e. dye stains), note the reason that pH could not be determined on the bottle and waste log. Waste Logs

Each waste container has an associated waste log to track the contents of the waste container. The waste logs indicate which chemicals and reagents should be disposed of in each waste container. The waste containers have the waste logs attached directly to the drum or bucket. The liquid waste bottles in the fume hood have the waste logs attached to the sash of the fume hood.

When a chemical is disposed of, the waste log on the outside of the container or on the fume hood sash must be marked (if not already marked).

Waste logs for the waste disposal containers are stored in the Chemicals and Reagents binder located in the processing lab. Additional waste logs can be printed from H:\CB\Forensics\General\SAFETY DETAIL INFO\Safety\Waste Logs\LP. Copies of waste logs for the barrels are also located in the red binder in the hazardous waste room. Disposal of Hazardous Waste

While the waste logs are a quick reference, be mindful that the decision of what waste container to use is based on three things:

- Is it solid or liquid?
- Is it basic or acidic?
- Are there flammables (organic solvents) present?
- Is it a full container of liquid or solid chemical?
- Is it paper/plastic/glass contaminated with a chemical?

Solid Hazardous Waste

Paper, plastic, or glass contaminated with hazardous waste can be disposed of in the regular trash.

Disposing of a container of solid chemical (e.g. expired DFO solid or maleic acid solid) requires different handling depending on the chemical. This information can be found on the waste logs. The following table also provides this information:

<table>
<thead>
<tr>
<th>Solid</th>
<th>Disposal Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acid yellow</td>
<td>Acid Solid – contact Seized Drugs</td>
</tr>
<tr>
<td>Basic yellow 40</td>
<td>Solvent Solid – dissolve in methanol and dispose in Solvent Liquid bottle</td>
</tr>
<tr>
<td>DFO</td>
<td>Solvent Solid – dissolve in methanol and dispose in Solvent Liquid bottle</td>
</tr>
<tr>
<td>Indanedione</td>
<td>Solvent Solid – dissolve in methanol and dispose in Solvent Liquid bottle</td>
</tr>
<tr>
<td>Malic/Maleic acid</td>
<td>Acid Solid – contact Seized Drugs</td>
</tr>
<tr>
<td>-------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>MBD</td>
<td>Solvent Solid – dissolve in methanol and dispose in Solvent Liquid bottle</td>
</tr>
<tr>
<td>Naphthal blue black</td>
<td>Solvent Solid – dissolve in methanol and dispose in Solvent Liquid bottle</td>
</tr>
<tr>
<td>Ninhydrin</td>
<td>Solvent Solid – dissolve in methanol and dispose in Solvent Liquid bottle</td>
</tr>
<tr>
<td>Oil Red O</td>
<td>Solvent Solid – dissolve in methanol and dispose in Solvent Liquid bottle</td>
</tr>
<tr>
<td>R6G</td>
<td>Solvent Solid – dissolve in methanol and dispose in Solvent Liquid bottle</td>
</tr>
<tr>
<td>Sodium carbonate</td>
<td>Base Solid – contact Seized Drugs</td>
</tr>
<tr>
<td>Sodium hydroxide</td>
<td>Base Solid – contact Seized Drugs</td>
</tr>
<tr>
<td>5-Sulfosalicylic acid</td>
<td>Acid Solid – contact Seized Drugs</td>
</tr>
<tr>
<td>Zinc chloride</td>
<td>Acid Solid – dispose of in Acid Liquid bottle (does not need to be dissolved)</td>
</tr>
</tbody>
</table>

**Liquid Hazardous Waste**

Liquid hazardous waste typically goes into one of five liquid waste bottles: Acid, Base, Solvent, Flammable Acid, or Flammable Base.

All liquid waste must be pH tested prior to being placed into a bucket/barrel for disposal. The pH will be recorded on the bottle and on the waste log.

**Liquid Hazardous Waste – No Flammables (Organics)**

For liquid hazardous waste without flammables (organic solvents) present, the pH of the solution will determine if it is disposed of in the acid waste bottle, solvent waste bottle, or base waste bottle. The easiest way to determine if it is acidic or basic is to look at the components. If there is a base, it goes in the Base waste bottle. If there is any acid, it goes in the Acid waste bottle. If there is neither, it goes in the Solvent waste bottle.

If there are both acids and bases present, pH test strips are available in the fume hood to test reagents. If the pH strip reads between 0 and 6, the reagent must be disposed of in the Acid waste bottle. If the pH is 7, it is disposed of in the Solvent waste bottle. If the pH is between 8 and 14, it is disposed of in the Base waste bottle.

**Liquid Hazardous Waste – Flammables (Organics)**

For liquid hazardous waste with a flammable (organic) component, the pH of the solution will determine if it is disposed of in the Flammable Acid, Flammable Base or Solvent bottle. The easiest way to determine if it is acidic or basic is to look at the components. If there is a base, it goes in the Flammable Base waste bottle. If there is any acid, it goes in the Flammable Acid waste bottle. If there is neither, it goes in the Solvent waste bottle.

If the pH strip reads between 0 and 6, the reagent must be disposed of in the flammable/acid bucket. If the pH is 7, it is disposed of in the solvent bucket. If the pH is between 8 and 14, it is disposed of in the flammable/base bucket.

**Transferring Waste to the Hazardous Waste Room for Pick-Up**

When a solid waste container is full, it must to be sealed properly, dated, and taken down to the hazardous waste disposal room.
If a liquid waste bottle in the fume hood is full, complete the end date and pH on the label on the bottle as well as the waste log. Take the appropriate waste log from the fume hood and the bottle to the hazardous waste room. Place the bottle in the proper large chemical disposal bucket. Tape the waste log to the barrel waste log located on the lid of that chemical disposal bucket. If starting a new barrel or bucket, the barrel waste logs are located in the red binder in the hazardous waste room or can be printed from H:\CB\Forensics\General\SAFETY DETAIL INFO\Safety\Waste Logs\Disposable Room Waste Logs

Create a new liquid waste container for the fume hood. Make sure the bottle is properly labeled and a new waste log is affixed to the fume hood sash. Empty waste bottles are located below the fume hood.

If disposing of a large volume of an expired reagent or chemical, the entire bottle/container can be taken directly to the hazardous waste room for disposal.

Laundry

Used lab coats and towels need to be placed in the hamper located in the lab by Wednesday afternoon. The laundry representative arrives on Thursdays for pick-up and drop-off. Extra towels are stored by the back door of the lab and can be taken as needed. Additional instructions have been provided by Sr. LEST; please contact the Sr. LEST or lab aide if you have any questions or concerns regarding lab coats.

Semi-Annual Maintenance and Verification of CA chambers and Environmental Chambers

Follow the maintenance and verification instructions for the chambers and the recirculator in the Latent Print Technical Manual.

The CA chamber and environmental chamber maintenance and verification must be done before the end of June and end of December each year.

Order the filter kit for the Condensate Recirculator in July; recirculator maintenance is due by the end of December.

Monthly Balance Checks

Check the balance and write it in the Internal Monthly Calibration Check – Balance Verification Log. Follow the instructions in the Latent Print Technical Manual.
## LVMPD FORENSIC LABORATORY
### TECHNICAL PROCEDURES
#### LATENT PRINT DETAIL

### Appendix G  Title: Approved Vendors (Manufacturers)

<table>
<thead>
<tr>
<th>Item</th>
<th>Manufacturer (Vendor)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetic acid, glacial</td>
<td>Amresco (VWR)</td>
</tr>
<tr>
<td>Acetone</td>
<td>EMD, BDH (VWR)</td>
</tr>
<tr>
<td>Acetonitrile</td>
<td>EMD (VWR), Fisher</td>
</tr>
<tr>
<td>Acid Yellow solid</td>
<td>Arrowhead Forensics</td>
</tr>
<tr>
<td>Ardrox P-133D</td>
<td>Safariland or Armor Forensics</td>
</tr>
<tr>
<td>Basic Yellow 40 solid</td>
<td>Arrowhead Forensics</td>
</tr>
<tr>
<td>Bichromatic Fingerprint Powder</td>
<td>Safariland</td>
</tr>
<tr>
<td>Black Fingerprint Powder</td>
<td>Safariland</td>
</tr>
<tr>
<td>Cyanoacrylate (superglue)</td>
<td>K&amp;R International (Safariland); Forensics Source (via VWR); Arrowhead Forensics</td>
</tr>
<tr>
<td>Cyanobloom</td>
<td>Foster and Freeman</td>
</tr>
<tr>
<td>DFO (1,8-Diazafluoren-9-One) solid</td>
<td>Arrowhead Forensics</td>
</tr>
<tr>
<td>Distilled Water</td>
<td>Sparkletts</td>
</tr>
<tr>
<td>Ethanol (200 proof)</td>
<td>Acros Organics (Fisher or VWR)</td>
</tr>
<tr>
<td>Ethyl Acetate</td>
<td>Millinckrodt, ACROS, EMD (VWR)</td>
</tr>
<tr>
<td>Crystal/Gentian Violet solid</td>
<td>Fisher, VWR, Sigma</td>
</tr>
<tr>
<td>HFE-7100</td>
<td>3M, Fisher, Safariland</td>
</tr>
<tr>
<td>Indanedione solid</td>
<td>Safariland, Fisher; Reddy Chemtech; Crime Sciences</td>
</tr>
<tr>
<td>Isopropyl Alcohol</td>
<td>Burdick and Jackson, BDH (VWR)</td>
</tr>
<tr>
<td>Maleic Acid solid</td>
<td>Safariland</td>
</tr>
<tr>
<td>MBD solid</td>
<td>Acros Organics (VWR)</td>
</tr>
<tr>
<td>Methanol</td>
<td>BDH, VWR</td>
</tr>
<tr>
<td>Napthol Blue Black solid</td>
<td>Sigma</td>
</tr>
<tr>
<td>Ninhydrin solid</td>
<td>Sirchie or Safariland</td>
</tr>
<tr>
<td>Nitric Acid</td>
<td>BDH, VWR</td>
</tr>
<tr>
<td>Oil Red O solid</td>
<td>Arrowhead Forensics</td>
</tr>
<tr>
<td>Petroleum Ether</td>
<td>BDH (VWR)</td>
</tr>
<tr>
<td>Physical Developer kit</td>
<td>Safariland</td>
</tr>
<tr>
<td>Rhodamine 6G solid</td>
<td>Safariland or Sigma</td>
</tr>
<tr>
<td>Silver Nitrate solid</td>
<td>Alfa Aesar, EMD (VWR)</td>
</tr>
<tr>
<td>Small Particle Reagent, Dark or White</td>
<td>Sirchie</td>
</tr>
<tr>
<td>Sodium carbonate solid</td>
<td>EMD (VWR)</td>
</tr>
<tr>
<td>Sodium hydroxide beads</td>
<td>Fisher, BDH, Amresco (VWR)</td>
</tr>
<tr>
<td>5-Sulfosalicylic Acid</td>
<td>EMD, Amresco (VWR)</td>
</tr>
<tr>
<td>Wetwop, Black or White</td>
<td>Safariland</td>
</tr>
<tr>
<td>Zinc Chloride</td>
<td>Alfa Aesar (Sigma) or VWR</td>
</tr>
</tbody>
</table>
Appendix H  Title: LIMS Sequence and Priority

Scope

This appendix defines the numbers assigned to the sequence and priority categories in the LIMS Unit Record Details. Priority status is dynamic and may be assigned or changed based on customer needs which are not contemplated in this document. When needed priority status may be sub-divided by adding a numerical prefix to the Notes field in the LIMS Unit Record (e.g. 1, 2, 3, etc.).

Sequence

1 – Ready for latent print examination
2 – Case analyst may swab evidence for DNA and proceed with latent print examination
3 – Waiting for DNA examination

Priority

1 – Cases with an assigned court date or priority requested by a Captain or Lieutenant
2 – Priority requested by a Sergeant or TLI Confirmations
3 – Processing and comparisons for crimes against persons
4 – Processing and comparisons for property crimes
5 – Priority Administrative AFIS requested by CSI Liaison, Captain, Lieutenant, or Sergeant
   Priority 5 Administrative AFIS will be subdivided into 3 categories
   50 – Major Case Protocol
   51 – High Priority (Work to complete the day received)
   52 – 407’s/crimes against persons
   53 – Crimes against property
6 - Administrative AFIS for crimes against persons
7 - Administrative AFIS for property crimes
8 – TLIs and Automatic ULF Searches
9 – Proficiency Tests
10 – New cases waiting for triage
11 – Training cases
99 – Administrative AFIS for Cold Cases
Appendix I  Title:  Ensuring the Quality of Proficiency Tests

Scope

This appendix describes the procedure for validating internally generated and previously used proficiency tests.

Comparison and AFIS Tests

Internally generated latent print comparison proficiency tests will be prepared utilizing ground truth samples with an answer key indicating the correct results. Previously used proficiency tests, internal or external, may be reissued provided that the original answer keys are still available.

Internally generated latent print AFIS proficiency tests will be prepared utilizing a bank of test samples that have been evaluated for AFIS suitability. An answer key indicating AFIS suitability and consensus AFIS encoding for NEC MBIS and NGI will be prepared.

Processing Tests

When internally creating latent print processing proficiency tests, an additional set of test materials will be created utilizing the same items and the same method of applying the test prints. The extra set of test materials will be subjected to the appropriate sequential processing methods. The test will be considered acceptable if the test prints develop as expected. The results will be recorded in an answer key. Previously used samples from internal or external proficiency tests will not be reissued. However, previous internal or external exams may be used as a template for creating new test materials. These tests will be validated using the above procedure.