



ARKANSAS STATE CRIME LABORATORY LATENT PRINTS QUALITY MANUAL

DIRECTOR:

KERMIT B. CHANNELL, II

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1 SCOPE

This manual follows the requirements specified by ANSI National Accreditation Board (ANAB), which is based on the ISO/IEC 17025:2017 standards and the 2017 ANAB ISO/IEC 17025:2017 — Forensic Science Testing and Calibration Laboratories Accreditation Requirements (AR 3125).

The ASCL Quality Manual (ASCL-DOC-01) outlines the policies and procedures under which the laboratory operates. This manual acts as a set of supplemental policies and procedures required to competently perform testing in the Latent Print Section.

When the section policy does not differ from the lab wide policy in any significant manner, the reader will be referred to the ASCL Quality Manual (ASCL-DOC-01) for the policy.

1.1 INTERNATIONAL STANDARD: GENERAL REQUIREMENTS

See *ASCL Quality Manual* (ASCL-DOC-01).

1.2 INTERNATIONAL STANDARD: SCOPE

See *ASCL Quality Manual* (ASCL-DOC-01).

1.2.1 ANAB PROGRAM

See *ASCL Quality Manual* (ASCL-DOC-01).

2 NORMATIVE REFERENCES

The Latent Print section follows applicable references listed in the *ASCL Quality Manual (ASCL-DOC-01)*. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Additional references may include:

- *ASCL Personnel Handbook (ASCL-DOC-02)*
- *ASCL Health and Safety Manual (ASCL-DOC-08)*
- *Latent Print Training Manual (LP-DOC-02)*
- *LP Processing Training Manual (LP-DOC-06)*

These manuals will be reviewed and revised as needed. Each employee reviews the *ASCL Code of Ethics Policy* on an annual basis.

3 TERMS AND DEFINITIONS

Some additions to the *ASCL Quality Manual* (ASCL-DOC-01) that are commonly used in the Latent Print Section are listed below.

AFIS

Acronym for Automated Fingerprint Identification System

CHARACTERISTICS

Distinctive details of the friction ridges – referring to the Level 1, 2, and 3 details

EXEMPLARS

The prints of an individual, associated with a known or claimed identity, and deliberately recorded electronically, by ink, or by another medium (also known as Known Prints)

NGI

Next Generation Identification is an extension of the Integrated Automated Fingerprint Identification System (IAFIS)

TOLERANCE

An analyst's assessment of how willing he or she is to accept differences in appearance due to distortions when the feature in the latent print is compared to a corresponding feature in the known print.

3.1 MASTER ABBREVIATION LIST

<i>Abbreviations</i>	<i>Meaning</i>
# or NO	Number
✓	Check
(s)	Suspect
(v)	Victim
/	And
AB	Amido black
ALS	Alternate light source
ANIN	Acetone ninhydrin
ASNE	Also submitted not examined
BB	Brown box
BE	Blue evidence
BP	Black powder
BPS	Brown paper sack
BRO	Brown
C	Cartridge
CA	Cyanoacrylate (superglue)
CC	Cartridge casing
CD	Compact disc

CK(s)	Check or Checks
CL	Clean
COC	Chain of custody
COMP	Comparison
CPD	Carpal delta
CV	Crystal violet
ENIN	Ether ninhydrin
EVI	Evidence
EX	Exclusion
EXC	Excessive
F	Foray
FI	Fiber
FPR	Fingerprint record
FRAG/FRAGS	Fragment/Fragments
GB	Gun blue
GP	Greenwop powder
HG	Handgun
HT	Hypothenar
ID	Identification
INCON	Inconclusive
INSUFF	Insufficient
L	Left
LG	Long gun
LP(s)	Latent print(s)
JT	JusticeTrax LIMS-Plus
LCV	Leuco-crystal violet
LFP	Latent fingerprint
LIMS	JusticeTrax LIMS-Plus
ME	Manila envelope
MIN	Minimal
MOD	Moderate
MP	Magnetic powder
NIN	Ninhydrin
NV	No value
PG	Page
PP	Palm print
PPR	Processed prior to receiving
PROC	Processing
R	Right
R6G	Rhodamine 6G
RE	Red evidence
RET	Returned
RP	Redwop powder
SSP	Sticky side powder
STC	Said to contain
SUB	Substrate
V or VIS	Visual
VER	Verify/Verification
WE	White evidence

WPS	White paper sack
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4 GENERAL REQUIREMENTS

4.1 IMPARTIALITY

See *ASCL Quality Manual* (ASCL-DOC-01).

4.1.1 GENERAL

See *ASCL Quality Manual* (ASCL-DOC-01).

4.1.2 PERSONNEL

See *ASCL Quality Manual* (ASCL-DOC-01).

4.1.3 FISCAL

See *ASCL Quality Manual* (ASCL-DOC-01).

4.1.4 RISKS TO IMPARTIALITY

See *ASCL Quality Manual* (ASCL-DOC-01).

4.1.5 ACTIONS TAKEN IN RESPONSE TO RISK

See *ASCL Quality Manual* (ASCL-DOC-01).

4.2 CONFIDENTIALITY

4.2.1 STATUTE

See *ASCL Quality Manual* (ASCL-DOC-01).

4.2.2 THIRD-PARTY RELEASE

See *ASCL Quality Manual* (ASCL-DOC-01).

4.2.3 THIRD-PARTY SOURCE

See *ASCL Quality Manual* (ASCL-DOC-01).

4.2.4 SCOPE OF CONFIDENTIALITY

See *ASCL Quality Manual* (ASCL-DOC-01).

5 STRUCTURAL REQUIREMENTS

5.1 ESTABLISHMENT

See *ASCL Quality Manual* (ASCL-DOC-01).

5.2 MANAGEMENT

Also see *ASCL Quality Manual* §§ 5.2.1–5.2.5 (ASCL-DOC-01).

5.2.1 CHIEF LATENT PRINT EXAMINER

QUALIFICATIONS

A bachelor's degree from an accredited college or university with a major in forensic science, criminalistics, or in a physical/natural science (or equivalent) and five years of technical and professional experience as a Latent Fingerprint Examiner in a forensic laboratory or identification division is required. The Chief Latent Print Examiner should be an IAI Certified Latent Print Examiner.

Professional experience as a latent fingerprint examiner in a recognized forensic laboratory, institution, or an identification division may be substituted on a one year work time for one year of the required educational background. The individual must have testified as an expert in the field of latent fingerprint identification in a court of law.

A Chief Latent Print Examiner must be able to successfully complete the required tasks outlined in the *Latent Print Training Manual (LP-DOC-02)* and the *Latent Print Processing Training Manual (LP-DOC-06)*.

AUTHORITIES & RESPONSIBILITIES

The Latent Print section chief will have the overall responsibility for the technical operations and the provision of the resources needed to ensure the required quality of laboratory operations, in addition to the following:

- Overseeing day-to-day operation of the Latent Print Section (e.g., scheduling workload, supervising analysts, monitoring and reviewing results and case reports). These duties may be distributed among the latent print personnel to facilitate case flow.
- Establishing professional liaisons with colleagues engaged in latent print casework and research.
- Conducting informational seminars for the customers of the laboratory and members of the criminal justice system (e.g., judges, prosecutors, police administrators, investigators, patrolmen, and cadets).
- Monitoring training programs for the latent print section personnel.
- Enforcing safety procedures.

- Ensuring the management system related to quality is implemented and followed.
- Analyzing casework, providing expert testimony, and performing other routine duties of a latent print examiner/technician (see Latent Print Examiner/Latent Print Technician job descriptions).
- Ensuring compliance with ANAB requirements within the Latent Print Section and its categories of testing.
- The Chief Latent Print Examiner will appoint an examiner to serve as a deputy for key management personnel when the Chief Latent Print Examiner will be absent for three days or longer. All affected personnel shall be notified.
- All section employees will be notified of their responsibilities and expectations and will be provided feedback on job performance through annual performance evaluations.
- Information concerning the quality system will be conveyed by the Chief Latent Print Examiner to all personnel by means of routine section meetings and/or electronic communication.

5.2.2 LATENT PRINT EXAMINER

QUALIFICATIONS

A bachelor's degree from an accredited college or university with a major in forensic science, criminalistics, or a physical/natural science (or equivalent) is required. Three years' experience in the latent prints discipline, preferably in an accredited laboratory, may be substituted for this educational requirement.

A latent print examiner must be able to successfully complete the required tasks outlined in the *Latent Print Training Manual (LP-DOC-02)* and the *Latent Print Processing Training Manual (LP-DOC-06)*.

AUTHORITIES & RESPONSIBILITIES

- Analyze, collect, preserve, and compare latent prints and other physical evidence in the laboratory, as well as under potentially adverse conditions at major crime scenes.
- Locate, develop, recover and preserve latent impressions on a wide variety of materials and surfaces using physical, chemical, electronic, and optical techniques.
- Photograph latent impressions using digital imaging equipment.
- Enter suitable latent prints into the Automated Fingerprint Identification System/Next Generation Identification (AFIS/NGI).
- Determine identifications and exclusions by comparing and verifying latent prints to known exemplars of AFIS candidate lists and suspects listed on the *ASCL evidence submission form (ASCL-FORM-12)*.
- Write detailed reports concerning results of analysis.
- The recovery and possible identification of fingerprints and palm prints from deceased and decomposed bodies, victims and suspects of crime.

- Provide training to law enforcement personnel concerning the proper collection and preservation of physical evidence or other informative information.
- Testify in criminal legal proceedings as needed concerning methods of analysis and results.

5.2.3 LATENT PRINT TECHNICIAN

QUALIFICATIONS

A high school diploma (or equivalent) is required.

A latent print technician must be able to successfully complete the required tasks outlined in the *Latent Print Processing Training Manual (LP-DOC-06)*.

AUTHORITIES & RESPONSIBILITIES

- Analyze, collect and preserve latent prints and other physical evidence in the laboratory, as well as under potentially adverse conditions at major crime scenes.
- Locate, develop, recover and preserve latent impressions on a wide variety of materials and surfaces using physical, chemical, electronic, and optical techniques.
- Photograph latent impressions using digital imaging equipment.
- Write detailed reports concerning results of analysis.
- Recover fingerprints and palm prints from deceased and decomposed bodies, victims and suspects of crime.
- Provide training to law enforcement personnel concerning the proper collection and preservation of physical evidence or other informative information.
- Testify in criminal legal proceedings as needed concerning methods of analysis and results.

5.2.4 SECTION QUALITY MANAGER

QUALIFICATIONS

The Section Quality Manager will be appointed by the section chief to ensure that the quality management system is implemented and followed.

AUTHORITIES AND RESPONSIBILITIES

- Maintains and updates the section quality and training manuals.
- Monitors section practices to verify systemic compliance with standard of procedures.
- Monitors reagents and respective logbooks to ensure proper documentation.
- Evaluates instrument calibration and maintenance records.
- Periodically assesses the adequacy of casefile/report review activities.
- Ensures the validation of new technical procedures.
- Investigates technical problems, proposes remedial action, and verifies implementation.
- Recommends training to improve the quality of the section staff.
- Proposes corrections and improvements in the quality system within the section.

- Ensures compliance with ANAB Requirements.

5.2.5 SECTION HEALTH AND SAFETY MANAGER

QUALIFICATION

The section Safety Manager will be appointed by the section chief to ensure that the health and management system is implemented and followed.

AUTHORITIES AND RESPONSIBILITIES

- Assists the section chief in teaching safety rules, regulations and procedures within the section and the laboratory.
- Ensures that proper practices and procedures (e.g., PPE use) are being followed.
- Recommends and implements changes in safety rules, regulations and procedures to the section chief and the lab wide Health and Safety Manager; assists in resolving safety incidents and maintain records of such incidents.
- Monitors the procurement, use, and disposal of chemicals used in the section.
- Maintains a current copy of the section MSDS.
- Conducts monthly safety inspections and ensures that proper practices and procedures are being followed in the section.
- Seeks for ways to improve the safety program within the section and the laboratory.

5.2.6 SECTION TRAINING OFFICER

QUALIFICATION

The section Training Officer will be appointed by the section chief to ensure that an analyst training program is implemented and followed when a new analyst is hired.

AUTHORITIES AND RESPONSIBILITIES

- Maintains and updates the section training manuals.
- Monitors section practices to verify systemic compliance with standard of procedures.
- Periodically assesses the adequacy of casefile/report review activities.
- Recommends training to improve the quality of the section staff.
- Proposes corrections and improvements in the training system within the section.

5.3 SCOPE OF LABORATORY ACTIVITIES

See *ASCL Quality Manual* (ASCL-DOC-01).

5.4 NORMATIVE DOCUMENTS

See §2 for a list of normative documents used in the Latent Print Section.

5.5 LABORATORY OPERATIONS

5.5.1 GENERAL

See *ASCL Quality Manual* (ASCL-DOC-01).

5.5.2 AUTHORITIES AND INTERRELATIONSHIPS

See *ASCL Quality Manual* (ASCL-DOC-01).

5.5.3 QUALITY MANUAL

The purpose of the Latent Print Section Quality Manual (LP-DOC-01) is to document the policies and procedures of the section. This document is readily available to all laboratory personnel via Qualtrax, and on the website to the public. This manual is annually reviewed by the Chief Latent Print Examiner and the Section Quality Manager, and updated as needed to reflect any changes in policies or procedures.

It is recognized that unforeseen circumstances may arise which require immediate deviations from the policies and procedures of this manual. If this deviation affects multiple cases, the request for an exception to policy will be submitted to the Chief Latent Print Examiner, or designee, and the request must include an adequate description of the circumstances requiring the exception. The Chief Latent Print Examiner will maintain documentation of the approved policy exception. Deviations which only affect a small number of cases may be documented in the case file(s) without the aforementioned requirements.

New policies may be approved and distributed by the section chief. Changes to any manual require a revision of the affected document through the Qualtrax system.

5.6 QUALITY MANAGEMENT

See *ASCL Quality Manual* (ASCL-DOC-01).

5.7 MANAGEMENT SYSTEM COMMUNICATION AND INTEGRITY

See *ASCL Quality Manual* (ASCL-DOC-01).

6 RESOURCE REQUIREMENTS

6.1 GENERAL

See *ASCL Quality Manual* (ASCL-DOC-01).

6.2 PERSONNEL

6.2.1 GENERAL

See *ASCL Quality Manual* (ASCL-DOC-01).

6.2.2 COMPETENCE REQUIREMENTS

See *ASCL Quality Manual* (ASCL-DOC-01).

6.2.2.1 ANALYST/EXAMINER EDUCATIONAL REQUIREMENTS

See §5.2.6 of the *Latent Print Section Quality Manual* (LP-DOC-01).

6.2.2.2 TRAINING PROGRAM

The Chief Latent Print Examiner shall ensure the competence of all who operate specific equipment, perform tests, evaluate results and sign test reports. Training will be completed under the supervision of the section's training officer or another competent examiner.

An individual selected as a Latent Print Examiner trainee must be able to successfully complete the tasks indicated in the Arkansas State Crime Laboratory Latent Print Processing Training Manual and the Latent Print Examiner Training Program, outlined in LP-DOC-02 and LP-DOC-06 respectively.

An individual selected as a Latent Print Technician trainee must be able to successfully complete the tasks indicated in the Arkansas State Crime Laboratory Latent Print Processing Training Manual, outlined in LP-DOC-06.

The training program shall include the completion of assigned readings, practical assignments, supervised casework, moot court, and a competency examination. All training activities should be documented and maintained in the trainee's training binder.

If any amount of comparable training from another forensic laboratory or institution has been completed and documentation of this training is available, the documentation will be reviewed and the training program shortened as found to be appropriate.

The Chief Latent Print Examiner shall document by memorandum to the Director and Quality Assurance Manager that the individual has been properly trained and that their ability to perform the specified testing has been assessed. This record shall be kept in the individual's training binder

and in the Training section of the Personnel tab in Qualtrax. In addition, the Analyst and Technician Competency Authorization Documentation form (ASCL-FORM-62) must be completed (or updated) and recorded in the Personnel tab of Qualtrax.

6.2.2.3 LITERATURE REVIEW

The Latent Print section encourages the distribution and review of current literature related to the discipline. A literature review file is located in Qualtrax, to which relevant literature is periodically added. At a minimum, analysts shall document reviewed literature on a quarterly basis in the electronic Literature Review Log maintained in Qualtrax.

6.2.3 COMPETENCE OF STAFF

See *ASCL Quality Manual* (ASCL-DOC-01).

6.2.4 DUTIES, RESPONSIBILITIES, AND AUTHORITIES

See *ASCL Quality Manual* (ASCL-DOC-01).

6.2.5 PERSONNEL REQUIREMENTS

See *ASCL Quality Manual* (ASCL-DOC-01).

6.2.6 AUTHORIZATIONS

See *ASCL Quality Manual* (ASCL-DOC-01).

6.3 FACILITIES AND ENVIRONMENTAL CONDITIONS

6.3.1 GENERAL

See *ASCL Quality Manual* (ASCL-DOC-01).

6.3.2 DOCUMENTATION

See *ASCL Quality Manual* (ASCL-DOC-01).

6.3.3 MONITORING RECORDS

See *ASCL Quality Manual* (ASCL-DOC-01).

6.3.4 CONTROL OF FACILITIES

See *ASCL Quality Manual* (ASCL-DOC-01).

6.3.4.1 ACCESS

Access to the main portion of the Latent Print section is accessible via security fob entry. These include: the AFIS room (three AFIS/NGI workstations, section printer, and digital imaging area), the powder processing room, the chemical processing room, and the DNA Collection area.

Access to all six office areas require a key for entry.

The six offices and processing rooms may serve as a temporary secure storage facility for evidence controlled by an individual analyst. Additional procedures regarding evidence storage are located in §7.4.1.1 of the Latent Print Quality Manual (LP-DOC-01).

6.3.4.2 PREVENTION OF ADVERSE INFLUENCES

These include, but are not limited to:

- Marking of lift cards and evidence processed, when practicable, with applicable case and item numbers.
- Wearing appropriate personal protective equipment (PPE) as necessary to avoid cross contamination and the maintain integrity of evidence.
- Cleaning work areas, as necessary, between samples and cases.
- Maintaining proper chain of custody and evidence storage to avoid any possible discrepancies.
- Following standard operating procedures (SOPs) outlined in this manual (LP-DOC-01) and the ASCL Quality Manual (ASCL-DOC-01).

6.3.5 EXTERNAL ACTIVITIES

See *ASCL Quality Manual* (ASCL-DOC-01).

6.4 EQUIPMENT

6.4.1 ACCESS

Only analysts who have been trained in the proper use of the instrumentation/equipment are authorized to use it. When new instrumentation or equipment requires a validation, appropriate personnel will be trained, and this training will be documented and kept in Qualtrax.

All instrumentation/equipment will be uniquely identified, if practicable. The identifier will be marked on the instrument/equipment and will be documented in the Latent Print Instrument/Equipment & Performance Verification log located as a hardcopy binder by the instrument or in the AFIS room and folder in Qualtrax.

Employees utilizing the Automated Fingerprint Identification System/Next Generation Identification (AFIS/NGI) database must receive clearance through the Arkansas State Police (ASP). Access to individual characteristic database samples is restricted to those employees authorized by the Executive Director. The Chief Latent Print Examiner will keep an updated list of employees that have access to the database samples.

6.4.2 OUTSIDE EQUIPMENT

See *ASCL Quality Manual* (ASCL-DOC-01).

6.4.3 PROPER FUNCTIONING

See *ASCL Quality Manual* (ASCL-DOC-01).

The Latent Print section has adequate equipment to perform the necessary testing and it is maintained by personnel of the Latent Print section.

Before instrumentation/equipment is placed into service, an initial calibration or performance verification shall be performed to ensure that it meets the specifications required by the appropriate method and will be documented in the General Maintenance log.

If instrumentation/equipment does not function to the calibration or performance verification, it will be taken out of service and either replaced or repaired prior to being placed back into service.

After significant maintenance has been performed, a calibration or performance verification shall be performed and recorded in the Latent Print Instrument/Equipment & Performance Verification Log or the General Maintenance Log. The verification logs are located by the equipment, while the General Maintenance Log is located in the AFIS room and will be annually scanned into Qualtrax. Any adjustments or maintenance of instrumentation/equipment will be recorded in the appropriate log.

6.4.3.1 REAGENT RECORDS AND LABELING

See *ASCL Quality Manual* (ASCL-DOC-01).

REAGENTS / CHEMICALS

The following rules shall be followed for reagents, chemicals and controls:

- Items with a manufacturer-specified expiration date may not be used after that date without documentation to support continued reliability.
- For items without a manufacturer-specified expiration date, dates will be based on experience, industry standard, or scientific consensus.
- Each analyst must ensure that the controls, reagents and/or chemicals used in their analysis are of satisfactory quality.¹
- Controls, reagents, or chemicals which are determined not to be reliable must be removed from use immediately.²
- Chemicals and solvents used in reagents should be of at least American Chemical Society (ACS) reagent grade.
- Deionized water (DI) will be used for reagent preparation.

¹ Non-routine reagents prepared for one time use may be recorded with the above items in the laboratory case notes and any excess reagent discarded after use.

² The reliability testing shall occur before use or, if appropriate, concurrent with the test.

- Stock solutions of general test reagents will be prepared using good laboratory practices as needed. After being made, they will be verified as appropriate with the control listed below in Table 1 and the date the reagent verification is completed will be documented in the Latent Print Reagent Log.

After a reagent is made, it will be verified by another member of the latent print section and recorded in the Latent Print Reagent Log. This log will be kept as a hardcopy in the bookcase located in the hallway of Latent Prints. The information recorded in the log book should contain who prepared each reagent, the date prepared, expiration date, the lot number of each chemical used, and who verified that reagent.

Table 1: Common Reagents and Appropriate Check Compounds

Reagent	Control
Amido Black	Known dried blood sample on substrate
Gentian Violet	Friction ridge skin residue on sticky side of tape
Ninhydrin	Friction ridge skin residue on porous substrate
Rhodamine 6G	Friction ridge skin residue processed with Cyanoacrylate Ester on non-porous substrate
Gun Blue (Perma Blue)	Friction ridge skin residue on metal ammunition
Cyanoacrylate Ester	Friction ridge skin residue on non-porous substrate

Reagents will also be checked prior to use in case work, as appropriate, and documented in the case notes as well as the Daily Reagent Verification log. If reagent does not meet standard it will not be used and a new solution will be prepared. Reagent verification will be conducted with the new solution to determine if it is working properly and documented in the Latent Print Reagent log.

The preparer of the reagent is responsible for ensuring the proper labeling of the chemical or reagent.

6.4.3.2 REFERENCE COLLECTION RECORDS

See *ASCL Quality Manual (ASCL-DOC-01)*.

6.4.4 PERFORMANCE VERIFICATION

Designated instrumentation/equipment will also be subject to a schedule of performance verifications or calibrations that will be recorded in the Daily Reagent Verification log or the AFIS Operational Readiness Verification (ORV) log, unless otherwise stated. If instrumentation/equipment does not function to the performance verification it will be taken out of service and either replaced or repaired prior to being placed back into service. Any adjustments or maintenance to instruments/equipment will be recorded in the General Maintenance log.

A performance verification shall be performed on instrumentation and equipment that has gone outside of the direct control of the laboratory (e.g., for repair or preventive maintenance) to ensure

that its calibration status is satisfactory before being returned to service. The Latent Print Instrument/Equipment & Performance Verification log will reflect that the equipment was functioning properly prior to being returned to service.

6.4.5 FITNESS FOR SERVICE

All instruments and equipment used for processing evidence or searching latent prints will be capable of providing a valid result. All equipment will be maintained in a clean, orderly, and safe condition. The Latent Print section equipment shall be handled responsibly to ensure optimal performance and to avoid contamination and premature wear and damage. It is the Latent Print Section Chief's responsibility to ensure that proper planning and care is taken when equipment is initially located or subsequently moved. Equipment that is infrequently used shall be stored (covered, powered-down, etc.) per the manufacturer's recommendations.

6.4.6 CALIBRATION REQUIREMENT

Instruments, equipment, and/or reagents used for processing evidence or searching latent prints that have a significant effect on the accuracy or validity of the result of the test shall be calibrated or performance verified before use in casework. See §6.4.4 and §9.1 of this manual for calibration and performance verification procedures for the instruments, equipment, and reagents of the Latent Print section.

6.4.7 CALIBRATION PROGRAM

See *ASCL Quality Manual* (ASCL-DOC-01).

6.4.7.1 COMPONENTS

See *ASCL Quality Manual* (ASCL-DOC-01).

6.4.8 LABELING

See *ASCL Quality Manual* (ASCL-DOC-01).

6.4.9 OUT OF SERVICE

See *ASCL Quality Manual* (ASCL-DOC-01).

6.4.10 INTERMEDIATE CHECKS

The intervals at which the performance of equipment in the Latent Print section is checked is outlined in §6.4.4.

6.4.11 CORRECTION FACTORS

See *ASCL Quality Manual* (ASCL-DOC-01).

6.4.12 EQUIPMENT ADJUSTMENT

See *ASCL Quality Manual* (ASCL-DOC-01).

6.4.13 EQUIPMENT RECORDS

AIR SCIENCE SAFEFUME™

The Latent Print section has two SafeFume™ cyanoacrylate fuming chambers located in the chemical processing room. The automatic control system programs the fuming cycle and controls all functions start-to-finish. It establishes the proper fuming intensity and duration. The fuming time, humidity, and chamber fume evacuation can be user-set. Performance verification is conducted on a daily basis if the fuming chamber is involved in a processing method for a given item or items of evidence. The analyst conducting the performance verification will initial and date the Daily Reagent Verification log, located in the chemical processing room, accordingly.

Should an analyst encounter a problem with a fuming chamber during use, the ‘Troubleshooting Checks’ provided in Table 2 will assist the analyst in determining the problem so it may be corrected. Any maintenance resulting from a ‘Troubleshooting Check’ will be recorded on the appropriate log sheet.

Table 2: Air Science™ Troubleshooting Guide

Troubleshooting Checks	Actions
Is heating element turned on?	Adjust the Thermostat switch to ON
Is the humidifier working properly?	Ensure the switch is ON and adjust the water to the appropriate level
Cycle not starting appropriately?	Ensure all locks on the door are closed and check the display for the green closed button

If any of the above actions fail to correct the problem the fuming chamber must be removed from service for repair/replacement. After it has been repaired/replaced the chamber should be checked to ensure proper functionality. All repairs and maintenance must be documented in the General Maintenance log. Filters should be replaced approximately once a quarter and with documentation indicating maintenance in the General Maintenance log.

ALTERNATE LIGHT SOURCES

The Latent Print section has one alternate light source that does not require regular maintenance or performance verification:

- Rofin Polilight PL 400 located at the digital imaging/processing station in the AFIS room

The Rofin Polilight PL 400 is a state-of-the-art forensic light source with 10 output bands from 400 nm to 530 nm.

The General Maintenance log is available for the alternate light source(s) in use in the Latent Print section, in the event that any maintenance is needed.

Should an analyst encounter a problem with the alternate light source during use, the ‘Troubleshooting Checks’ provided in Table 3 will assist the analyst in determining the problem so that it may be corrected. Any maintenance resulting from a ‘Troubleshooting Check’ will be recorded on the appropriate log sheet.

Table 3: Alternate Light Source Troubleshooting Guide

Troubleshooting Checks	Actions
Is light bulb damaged?	If damaged, replace bulb, document in maintenance log
Is the wavelength set in a viewable range for the dye stain?	Adjust as necessary (450nm to 540nm for R6G) Refer to §10.1.5
Are the correct barrier filters (goggles) being used?	Orange or red goggles are recommended for viewing of R6G. Refer to §10.1.5

If any of the above actions fail to correct the problem the alternate light source must be removed from service for repair/replacement. After the alternate light source is repaired/replaced, the alternate light source should be checked to ensure proper functionality and wavelength. All repairs and maintenance must be documented in the General Maintenance log.

Should an analyst encounter a problem with the all-purpose fuming cabinet during use the ‘Troubleshooting Checks’ provided in Table 3 will assist the analyst in determining the problem so it may be corrected. Any maintenance resulting from a ‘Troubleshooting Check’ will be recorded on the appropriate log sheet.

The Latent Print Instrument/Equipment & Performance Verification log will be kept as a hardcopy in the binder next to the equipment and older logs on the S: Latents Drive and/or Qualtrax. The General Maintenance log will be kept in the AFIS room library.

6.5 METROLOGICAL TRACEABILITY

6.5.1 GENERAL

See *ASCL Quality Manual* (ASCL-DOC-01).

6.5.2 TRACEABILITY TO THE INTERNATIONAL SYSTEM OF UNITS

See *ASCL Quality Manual* (ASCL-DOC-01).

6.5.3 ALTERNATE TRACEABILITY

See *ASCL Quality Manual* (ASCL-DOC-01).

6.6 EXTERNALLY-PROVIDED PRODUCTS AND SERVICES

6.6.1 GENERAL

See *ASCL Quality Manual* (ASCL-DOC-01).

6.6.2 RECORDS

See *ASCL Quality Manual* (ASCL-DOC-01).

6.6.3 COMMUNICATION

See *ASCL Quality Manual* (ASCL-DOC-01).

7 PROCESS REQUIREMENTS

7.1 REVIEW OF REQUESTS, TENDERS, AND CONTRACTS

7.1.1 GENERAL

The *ASCL Evidence Submission Form* (ASCL-FORM-12) shall normally be utilized to record the request, tender and contract with the customer.

MEDICAL EXAMINER LATENT PRINT REQUESTS

Requests for identification of deceased individuals from the Medical Examiner's Office are initiated by an email the Latent Print section. A LP/ME Identification request is initiated in JusticeTrax and an analyst is assigned to the case. The inked prints will be scanned into Foray™ by a morgue technician where they are stored as evidence and available for an analyst to then complete the request. A copy of the email initiating the request should be scanned into the JusticeTrax case images folder.

See *ASCL Quality Manual* (ASCL-DOC-01).

7.1.2 INAPPROPRIATE REQUESTS

See *ASCL Quality Manual* (ASCL-DOC-01).

See *ASCL Case Management Guidelines* (ASCL-DOC-10).

Known or inked fingerprint records that are submitted as evidence for comparative purposes must be recorded on an appropriate record (ex. Ten print or palm print records) bearing certain identifying information (ex. name, DOB, SSN) in order to allow a comparison.

7.1.3 STATEMENTS OF CONFORMITY

See *ASCL Quality Manual* (ASCL-DOC-01).

7.1.4 RESOLUTION OF DIFFERENCES

See *ASCL Quality Manual* (ASCL-DOC-01).

7.1.5 DEVIATION FROM THE CONTRACT

See *ASCL Quality Manual* (ASCL-DOC-01).

7.1.6 AMENDMENT OF THE CONTRACT

See *ASCL Quality Manual* (ASCL-DOC-01).

7.1.7 COOPERATION WITH CUSTOMERS

See *ASCL Quality Manual* (ASCL-DOC-01).

7.1.8 RECORDS OF REVIEW

See *ASCL Quality Manual* (ASCL-DOC-01).

7.1.9 DATABASE SEARCH EXTENT

7.1.9.1 AUTOMATED FINGERPRINT IDENTIFICATION SYSTEM (AFIS)

The Automated Fingerprint Identification System (AFIS) is a laboratory instrument that can be used to perform searches of the Arkansas state database of known finger and palm prints. The system is maintained by the Arkansas State Police (ASP).

Next Generation Identification (NGI) is another known print database used to perform searches, utilizing the Universal Latent Workstation (ULW) software, of the FBI's known finger and palm prints. The NGI system and ULW software is housed, maintained, and updated by the FBI.

PROCEDURES

All latent prints (fingers and palms) that are of AFIS quality and have not been manually identified with known prints should be searched in the AFIS. The determination of which prints are of AFIS quality is made by the examiner. The examiner should consider several factors when determining which prints should be searched such as: the type of evidence; the quality and quantity of minutiae detail; and the AFIS/NGI limitations. When searching fingerprints in the AFIS the examiner should observe a minimum of eight discernable minutiae. When searching palm prints in the AFIS the examiner should observe a minimum of twelve discernable minutiae. Latent fingerprints searched in the NGI should have ten discernable minutiae present while fourteen discernable minutiae should be present in palm prints. Latent prints such as lower joints or the extreme sides of the fingers are examples of what may not be suitable for entry into AFIS/NGI.

Any conclusions made after an AFIS/NGI search will be noted on the Match Report printed from the database used in that search. The hard copy of the fingerprint/palm print record must be printed for documenting identifications and verifications.

The examiner is encouraged to initiate latent print searches using the probable fingers and appropriate areas of the palms.

The extent of any AFIS/NGI searches will be communicated to the customer via the examiner's report.

7.1.9.2 UNIDENTIFIED LATENT FILE (ULF)

Unidentified latent prints are retained in the database and searched against new tenprints that are continuously added. The workstations located in the Latent Print section are designed to receive all the reverse searches that are returned by the system. These searches are reviewed by a Latent Print Examiner and the determination of a positive or negative search is determined. Negative search results do not require a verification before the search is cleared. If a search returns a positive identification then the submitting agency will be notified. No new ASCL report will be issued for these findings. Latent prints that are searched by examiners should be added to the ULF file when possible.

7.1.9.3 POST-MORTEM TENPRINT ENTRY

A morgue technician records inked prints of deceased individuals with no known fingerprint records for entry into the Arkansas State Database. This is done to search against the Unidentified Latent File (ULF) in attempt to determine the source of prints that have been previously searched in the AFIS. The entry process is completed by an analyst/technician and is as follows:

- A morgue technician records the post-mortem inked prints
- Every month the ten print records will be transferred to the LP section for entry
- The analyst/technician will ensure that a barcode with the case number and identifying information are on the records
- The analyst/technician will follow the instructions provided by the ASP for entering known deceased prints into the database
- A file will be kept to record which prints are recorded and entered

7.2 SELECTION AND VERIFICATION OF METHODS

7.2.1 SELECTION AND VERIFICATION OF METHODS

7.2.1.1 SELECTION OF METHODS

Only appropriate methods and procedures will be used in casework. The ASCL facilities provide sufficient environmental conditions to conduct all tests listed in this Procedures Manual with no further consideration required.

Visual examination of evidence is the first step in the processing procedure. Visual examination is the inspection for latent print residue that may be preserved photographically or determined to be unsuitable as it exists. In addition, visual inspection is the mechanism by which processing procedures are selected from observation of the residue, its condition, and composition, and of the article. Expertise is the ability of an examiner to determine as many factors as possible and to select examination approaches accordingly. Examination documentation shall include each examination activity conducted, the sequence of those activities and the results of each examination activity.

Examination activities include: development technique applied, photography, and sufficiency verification.

The selection of the processing techniques and their sequence depend on the surface of the evidence (substrate) and the composition of the latent residue deposited (matrix). The analyst/technician must use discretion when deciding on the process that will optimize development of friction ridge detail while also considering whether additional processing by other sections is requested. The processing techniques and their sequences are general guidelines; however, the exact procedures used are dependent on the nature of the evidence and the details of the case.

ELECTRONIC DATA

Latent print images captured in Foray™ More Hits prior to 2008 will be archived on suitable media. Current Foray™ images will be backed up and archived on suitable recording media and maintained off site on a weekly basis. Original images are secured by Foray™ and will remain unchanged.

7.2.1.1.1 TEST METHODS

See §9 for a list of test methods used in the Latent Print Section

7.2.1.1.2 COMPARISON OF KNOWN AND UNKNOWN

Analysts shall follow the ACE-V method to ensure that all unknown latent prints are evaluated to identify characteristics suitable for comparison prior to comparing to one or more known records.

7.2.1.1.3 CALIBRATION METHOD SELECTION

See *ASCL Quality Manual* (ASCL-DOC-01).

7.2.1.2 METHOD AVAILABILITY

See *ASCL Quality Manual* (ASCL-DOC-01).

7.2.1.3 METHOD VERSION

See *ASCL Quality Manual* (ASCL-DOC-01).

7.2.1.4 METHOD SELECTION

See *ASCL Quality Manual* (ASCL-DOC-01).

7.2.1.5 VALIDATION OF METHODS

See *ASCL Quality Manual* (ASCL-DOC-01).

7.2.1.6 METHOD DEVELOPMENT

See *ASCL Quality Manual* (ASCL-DOC-01).

7.2.1.7 DEVIATION FROM METHOD

See *ASCL Quality Manual* (ASCL-DOC-01).

7.2.2 VALIDATION OF METHODS

See *ASCL Quality Manual* (ASCL-DOC-01).

7.2.2.1 EXTENT OF VALIDATION

See *ASCL Quality Manual* (ASCL-DOC-01).

7.2.2.1.1 VALIDATION PROCEDURE

See *ASCL Quality Manual* (ASCL-DOC-01).

7.2.2.2 CHANGES TO VALIDATED METHODS

See *ASCL Quality Manual* (ASCL-DOC-01).

7.2.2.3 RELEVANCE TO NEEDS

See *ASCL Quality Manual* (ASCL-DOC-01).

7.2.2.4 VALIDATION RECORDS

See *ASCL Quality Manual* (ASCL-DOC-01).

7.3 SAMPLING

The Latent Print section does not conduct sampling or have a sampling plan.

7.4 HANDLING OF TEST ITEMS

7.4.1 GENERAL

Evidence will be checked out from Evidence Receiving in accordance with evidence policies. Analyst/technician should be aware of all the sections and testing that involves the evidence and should take the necessary precautions to preserve the integrity of the evidence. If there is any packaging deficiency noted at the time of receipt, it must be corrected, preferably by the submitting customer. If the customer is not available an Evidence Technician may take steps to correct the problem. However, if the deficiency is serious enough to bring into question the integrity or identity of the test item, the appropriate section chief and customer agency must be contacted to resolve the issue before the evidence is analyzed. If a packaging deficiency is not apparent until the case is checked out by an analyst/technician the analyst/technician may correct the deficiency. If there is any concern that the packaging deficiency has affected the integrity or identity of the test item, the Chief Latent Print Examiner and the customer agency shall be advised and consulted with for further instructions. The evidence will be returned to Evidence Receiving in a timely manner after

completion. All remedial actions taken to correct packaging or evidence deficiencies shall be noted in the case record (e.g., submission form or analyst/technician notes).

RESPONSIBILITIES AND PROCEDURES

See *ASCL Quality Manual* (ASCL-DOC-01).

SAFEGUARDING THE INTEGRITY OF EVIDENCE

Evidence in an analyst's/technician's possession may be securely stored in their office, in the locked evidence closet in Latent Prints (Room 264 or the powder and chemical processing rooms. Evidence must be kept in one of these locations for overnight storage. Evidence shall be maintained under appropriate conditions to prevent deterioration, loss or damage to the evidence during storage, handling or the testing process.

INDIVIDUAL CHARACTERISTIC DATABASES

The Latent Print section utilizes the Automated Fingerprint Identification System (AFIS) and the Next Generation Identification (NGI). Employees utilizing this database must receive proper training and/or clearance through the Arkansas State Police (ASP) prior to use. Individual characteristic database samples of the Latent Print section include copies of ten print cards of individuals. These ten print cards are treated as examination documentation. The known finger and palm prints of the AFIS are entered and controlled by the Arkansas State Police Identification Bureau. The records are stored according to State Identification Numbers (SID). The Arkansas State Crime Laboratory has no control over these records besides access to them for comparative purposes. See §7.1.9.1 for more detailed information regarding the AFIS/NGI.

7.4.1.1 HANDLING PROCEDURES

7.4.1.1.1 STORAGE

See *ASCL Quality Manual* (ASCL-DOC-01).

7.4.1.1.2 PACKAGING AND SEALING

See *ASCL Quality Manual* (ASCL-DOC-01).

Description of evidence packaging and sealing will be documented on LP-FORM-17, LP-FORM-36, or SER-FORM-04.

7.4.1.1.3 CHAIN OF CUSTODY

See *ASCL Quality Manual* (ASCL-DOC-01).

Evidence items (e.g. latent print lifts, known fingerprint exemplars) transferred to another examiner for verification or exclusion purposes shall be recorded on LP-FORM-19 indicating the verifiers handwritten initials and date.

7.4.1.1.4 CUSTOMER NOTIFICATION

See *ASCL Quality Manual* (ASCL-DOC-01).

7.4.2 ITEM IDENTIFICATION

See *ASCL Quality Manual* (ASCL-DOC-01)..

7.4.3 EXTENT

See *ASCL Quality Manual* (ASCL-DOC-01).

7.4.4 DEVIATIONS

See *ASCL Quality Manual* (ASCL-DOC-01).

7.4.5 ENVIRONMENTAL CONDITIONS

See *ASCL Quality Manual* (ASCL-DOC-01).

7.5 TECHNICAL RECORDS

7.5.1 GENERAL

See *ASCL Quality Manual* (ASCL-DOC-01).

7.5.1.1 TECHNICAL RECORD RETENTION

See *ASCL Quality Manual* (ASCL-DOC-01).

When it is not feasible to incorporate the original examination records (e.g., digital, scanned, and/or processed images) in the LIMS case file, these records may be stored external to the LIMS case file in archived Morehits™/Foray™ Digital Workplace imaging system. The location of these records will be specified in the case file.

7.5.1.2 ABBREVIATIONS

Please refer to Terms and Definitions in Latent Print Manual Section 3 or see *ASCL DOC-01 Quality Manual*.

7.5.1.3 TECHNICAL RECORD SUFFICIENCY

See *ASCL Quality Manual* (ASCL-DOC-01).

7.5.1.4 TECHNICAL RECORD PERMANENCY

See *ASCL Quality Manual* (ASCL-DOC-01).

7.5.1.5 REJECTION

See *ASCL Quality Manual* (ASCL-DOC-01).

7.5.1.6 CALIBRATION DATA

See *ASCL Quality Manual* (ASCL-DOC-01).

7.5.2 AMENDMENTS TO TECHNICAL RECORDS

See *ASCL Quality Manual* (ASCL-DOC-01).

7.6 EVALUATION OF MEASUREMENT UNCERTAINTY

The Latent Print section does not calculate any measurement of uncertainty values.

7.7 ENSURING THE VALIDITY OF RESULTS

7.7.1 GENERAL

See *ASCL Quality Manual* (ASCL-DOC-01).

When quality control data is found to be outside the acceptable criteria planned action shall be taken to correct the problem and to prevent incorrect results to be reported. If a reagent does not meet the acceptable criteria it will not be used; a new solution will be prepared, checked to determine if it is working properly and documented in the Latent Print Reagent Log. Instrument/equipment that does not meet the acceptable criteria shall be removed from service until they have been repaired and re-calibrated, if necessary. Any adjustments made will be documented in the Latent Print Instrument/Equipment & Performance Verification or General Maintenance log.

7.7.1.1 VERIFICATION

The Latent Print section relies on verification throughout the completion of casework. All evidence submitted must undergo a sufficiency verification to determine if any suitable ridge detail is present on the evidence before the case is complete. Documentation shall be noted on LP-FORM-19 and/or LP-FORM-20 as to what evidence was verified, who performed the verification, and the date. The verifier's handwritten initials shall be documented for each verification. Processing results shall be recorded on LP-FORM-20 prior to verification to allow for a blind verification of processing results.

All conclusions resulting from friction ridge examination(s) shall be verified by another examiner through separate and independent application of the ACE phases of the ACE-V methodology. If the verifying analyst draws the same conclusion as the primary analyst, documentation shall be noted on LP-FORM-19 as to what evidence was verified, who performed the verification and the date with the respective chain of custody. The verifier's handwritten initials shall be documented for each verification. If the verifier draws a different conclusion from the primary analyst, both analysts shall

attempt to come to a resolution. If a resolution cannot be achieved, the issue shall be brought to the attention of the Chief Latent Print Examiner. The resolution of any discrepancy shall be recorded in the examination record.

Any evidence that can be initialed and scanned should be scanned into JusticeTrax under the appropriate 'Request' folder and include the original analyst's/technician's handwritten initials and date of conclusion, the verifier's handwritten initials, and the date the verification was performed.

7.7.1.1.1 BLIND VERIFICATIONS

Blind verifications may be utilized for latent print comparison conclusions. During a blind verification, the verifier shall not be informed of the primary examiner's conclusions. Sufficiency verifications for evidence that has been processed, by the methods described in § 9, shall be blindly verified. Blind verifications shall be given to the verifier with minimal markings to allow unbiased analysis. The reporting analyst shall document in their notes that a blind verification was conducted and the conclusion of the blind verifier. Further discussion of blind verifications in comparison conclusions are described in section 10.2.6.1.

7.7.1.2 CASE REVIEW

See *ASCL Quality Manual* (ASCL-DOC-01).

7.7.1.2.1 TECHNICAL REVIEW

See *ASCL Quality Manual* (ASCL-DOC-01).

7.7.1.2.2 ADMINISTRATIVE REVIEW

See *ASCL Quality Manual* (ASCL-DOC-01).

7.7.1.2.3 TESTIMONY REVIEW

See *ASCL Quality Manual* (ASCL-DOC-01).

7.7.2 INTERLABORATORY COMPARISONS

See *ASCL Quality Manual* (ASCL-DOC-01).

7.7.2.1 EXTERNAL PROFICIENCY TESTING

See *ASCL Quality Manual* (ASCL-DOC-01).

The Latent Print discipline will successfully complete at least one external proficiency test annually.

7.7.3 MONITORING ACTIVITY ANALYSIS

See *ASCL Quality Manual* (ASCL-DOC-01).

7.7.4 INDIVIDUAL PERFORMANCE MONITORING

See *ASCL Quality Manual* (ASCL-DOC-01).

7.7.5 PROFICIENCY MONITORING REQUIREMENTS

See *ASCL Quality Manual* (ASCL-DOC-01).

The Arkansas State Crime Laboratory maintains a proficiency testing program designed to provide independent evaluation of individual technical expertise, as well as a mechanism to monitor training needs and procedural weaknesses for both individual analysts/technician and each discipline within the laboratory.

Each analyst/technician engaged in testing activities shall be proficiency tested at least once during each four-year accreditation cycle in each category of testing appearing on the ASCL's Scope of Accreditation. The categories of testing for the Latent Print discipline include:

- Latent Print Processing
- Latent Print Comparison

The Latent Print Technician shall be performance monitored in latent print processing annually. The Latent Print Examiner shall be performance monitored in latent print processing and latent print comparison annually.

All administration and examination documentation will be in the assigned electronic case file. This electronic version is considered the official proficiency case record. In addition, the following will be maintained in the case file:

- How the samples were obtained or created (after testing is complete and results have been received)
- Proficiency test results from the provider
- Corrective Action Request documentation, when applicable

Proficiency/Competency tests that are internally prepared will be documented with the *Latent Print Section Proficiency Preparation Form* (LP-FORM-31) and scanned into the appropriate case file.

7.7.6 PERFORMANCE MONITORING SCHEDULE

See *ASCL Quality Manual* (ASCL-DOC-01).

The Latent Print section will maintain a four year cycle of proficiency scheduling in Qualtrax.

7.7.7 PROFICIENCY TEST SOURCING

See *ASCL Quality Manual* (ASCL-DOC-01).

7.7.8 PERFORMANCE MONITORING RECORDS

See *ASCL Quality Manual* (ASCL-DOC-01).

7.8 REPORTING AND TESTIMONY

7.8.1 GENERAL

7.8.1.1 REVIEW AND AUTHORIZATION OF REQUESTS

See *ASCL Quality Manual* (ASCL-DOC-01).

7.8.1.1.1 DOCUMENTATION

See *ASCL Quality Manual* (ASCL-DOC-01).

7.8.1.2 REPORTS

See *ASCL Quality Manual* (ASCL-DOC-01).

7.8.1.2.1 REPORT DISTRIBUTION

See *ASCL Quality Manual* (ASCL-DOC-01).

7.8.1.2.2 REPORTING PROCEDURE

See *ASCL Quality Manual* (ASCL-DOC-01).

7.8.1.2.3 CALIBRATION

See *ASCL Quality Manual* (ASCL-DOC-01).

7.8.1.3 SIMPLIFIED REPORTING

See *ASCL Quality Manual* (ASCL-DOC-01).

7.8.1.3.1 REPORT ELEMENTS

See *ASCL Quality Manual* (ASCL-DOC-01).

7.8.2 COMMON REQUIREMENTS FOR REPORTS

7.8.2.1 REPORT ELEMENTS

See *ASCL Quality Manual* (ASCL-DOC-01).

- If needed, Latent Print examiners should request appropriate additional known prints (e.g. finger, palm, finger and palm) in the ASCL laboratory report.

7.8.2.2 RESPONSIBILITIES

See *ASCL Quality Manual* (ASCL-DOC-01).

7.8.3 SPECIFIC REQUIREMENTS FOR TEST REPORTS

7.8.3.1 ADDITIONAL STATEMENTS

See *ASCL Quality Manual* (ASCL-DOC-01).

7.8.3.1.1 STATUTORY REPORTING REQUIREMENTS

See *ASCL Quality Manual* (ASCL-DOC-01).

7.8.3.2 REPORTING SAMPLING

See *ASCL Quality Manual* (ASCL-DOC-01).

7.8.4 SPECIFIC REQUIREMENTS FOR CALIBRATION CERTIFICATES

See *ASCL Quality Manual* (ASCL-DOC-01).

7.8.5 REPORTING SAMPLING-SPECIFIC REQUIREMENTS

See *ASCL Quality Manual* (ASCL-DOC-01).

7.8.6 REPORTING STATEMENTS OF CONFORMITY

See *ASCL Quality Manual* (ASCL-DOC-01).

7.8.7 REPORTING OPINIONS AND INTERPRETATIONS

See *ASCL Quality Manual* (ASCL-DOC-01).

7.8.7.1 AUTHORIZATION

See *ASCL Quality Manual* (ASCL-DOC-01).

7.8.7.2 SCOPE OF OPINIONS/INTERPRETATIONS

See *ASCL Quality Manual* (ASCL-DOC-01).

7.8.7.3 DIALOGUE

See *ASCL Quality Manual* (ASCL-DOC-01).3

7.8.8 AMENDMENTS TO REPORTS

7.8.8.1 IDENTIFYING THE CHANGE(S)

See *ASCL Quality Manual* (ASCL-DOC-01).

7.8.8.2 STYLE OF AMENDMENT.

See *ASCL Quality Manual* (ASCL-DOC-01).

7.8.8.3 IDENTIFYING THE AMENDED REPORT

See *ASCL Quality Manual* (ASCL-DOC-01).

The original report will be removed from iResults by an iResults Administrator and replaced with a placeholder document.

7.8.9 SUPPLEMENTAL REPORTS

See *ASCL Quality Manual* (ASCL-DOC-01).

7.8.10 REPORTING GUIDELINES

The following information should be addressed in all Latent Print section reports:

- Latent prints present or developed on evidence shall be specifically identified and reported as to what type and how many of each type were found on each item.
- If needed, Latent Print Examiners should request appropriate additional known (e.g. finger, palm, finger and palm) prints in the ASCL laboratory report.
- Latent print examinations and comparisons can be limited in scope from what is specified in the “Analysis Requested” box on the *ASCL Evidence Submission Form* (ASCL-FORM-12) only after coordination with the submitter. If a limited examination/comparison is conducted, the identity of the individual with whom the action was coordinated, the date, and a clear explanation should be provided on an *ASCL Agency Contact Form* (ASCL-FORM-06) or documented e-mail and included in the case file.
- When associations are made, the significance of the association shall be communicated clearly and qualified properly in the report.
- Suitable ridge detail that was not compared or analyzed must be indicated in the case report.
- Latent print lifts created by the Latent Print section must be returned to the submitting agency and indicated in the case report.

7.8.10.1 COMPARATIVE EXAMINATIONS

ASSOCIATION / IDENTIFICATION

In an effort to standardize report writing in the Latent Print section the following suggested phrasing is provided. It is recognized that these phrases will not fit every reporting situation; exceptions are permissible. Examiners are encouraged to use this standardization in their notes and reports, but it is also recognized that some discretion is allowed for the variance of case circumstances.

Latent print comparison results never include qualified conclusions. There are only three possible examination conclusions which will be used in reports generated by the ASCL Latent Print section.

The conclusions of identification and exclusion will be documented in notes and in reports; however, the determining factors need not be included in reports.

7.8.10.1.1 IDENTIFICATION

Identification is the decision by a Latent Print examiner that there are sufficient features in agreement to conclude that two areas of friction ridge impressions originated from the same source.

Suggested Reporting Format:

- One latent print exhibiting sufficient unique characteristics to allow an identification to its source was observed on the evidence labeled E1.
- (Name) has been identified as the source of the latent finger/palm print labeled E1.
- The previously submitted latent print labeled E1 was compared with the AFIS fingerprint record for (Name and SID#/FBI#) with the following results: (Name) has been identified as the source of the latent print labeled E1.
- ME/LP request: The post-mortem inked print labeled PM1 has been identified as XXXXXX.
- ME/LP request: The imaged friction ridge skin labeled PM1 has been identified as XXXXXX.

7.8.10.1.2 EXCLUSION

Exclusion is the decision by the Latent Print examiner that there are sufficient features to conclude that two areas of friction ridge impressions did not originate from the same source. To reach the decision of exclusion, the examiner shall have a focal point (core, delta, major crease, etc.) and more than one target group.

Suggested Reporting Format:

- One latent print exhibiting class characteristics to allow a comparison for possible exclusionary purposes was observed on the evidence labeled E1.
- The latent print observed on the evidence labeled E1 exhibits reliable class characteristics to allow a comparison for possible exclusionary purposes.
- The latent print depicted in the digital image DSC_0003 obtained from the CD labeled E1 exhibits reliable class characteristics to allow a comparison for possible exclusionary purposes.
- The E1 latent print was directly compared with the fingerprint record for (Name and SID#/FBI#) with the following conclusion. (Name) has been excluded as the source of the E1 latent fingerprint/palm print.

7.8.10.1.3 INCONCLUSIVE

Inconclusive decisions occur for the following reasons: the implementation of an exclusion policy requiring the use of a focal point and more than one target group to exclude; when the known ten prints are insufficient to compare, or when the latent print and the known print lack clarity, a focal point, or target groups required to include or exclude.

Suggested Reporting Format:

- The latent print labeled E1 was directly compared with the fingerprint record for (Name and SID#/FBI#) with the following conclusion: (Name) cannot be identified or excluded as the source of the E1 latent print.
- The complete and clearly recorded fingerprints and/or palm prints, including the (anatomical location) and/or the Arkansas State Identification Number of any suspected source of the E1 latent print should be submitted under this laboratory case number if any additional analysis is required.
- The fingerprint record for (Name and SID#) is insufficiently recorded and cannot allow a complete comparison to the E1 latent print.

7.8.10.2 PROCESSING EXAMINATIONS

This section details the processing examinations (e.g., visual, chemical and/or physical) and results for each item which will be documented on LP-FORM-20. The results shall include the number of latent prints recovered from each item. Any lifts that are made by an analyst/technician on an evidence item must be scanned into the appropriate 'Requests' folder and returned to the submitting agency with the original evidence.

In an effort to standardize report writing in the Latent Print section the suggested phrasing is provided. It is recognized that these phrases will not fit every reporting situation; exceptions are permissible. Analysts/technicians are encouraged to use this standardization in their notes and reports, but it is also recognized that some discretion is allowed for the variance of case circumstances.

7.8.10.2.1 PROCESSING CASES WITH LATENT PRINT LIFTS

Cases submitted with processing and latent print lift cards and/or digital images will be examined by the Latent Print Technician. The latent print lifts will be examined before processing begins and if they are deemed sufficient by the technician and the verifier, the technician will transfer the entire case to an examiner. The examiner will then complete the case. If the technician and the verifier deem the prints insufficient, the technician will continue with processing the evidence.

7.8.10.2.2 PROCESSING CASES; LATENT PRINTS DEVELOPED

Cases processed by the Latent Print Technician with latent prints developed that are deemed sufficient by the technician and the verifier will be transferred to an examiner to complete the case. If the technician and the verifier agree that there were no sufficient prints developed, the technician will complete the case send the report.

Suggested Reporting Format for evidence that has been processed with suitable prints developed:

- The evidence labeled E1 was examined and processed with one latent print developed containing sufficient characteristics to allow a comparison.

Suggested Reporting Format for evidence that has been processed with no suitable prints developed:

- The evidence labeled E1 was examined and processed with no ridge detail developed.
- The evidence labeled E1 was examined and processed for latent prints with no latent prints developed exhibiting sufficient characteristics to allow for comparison.

Suggested Reporting Format for evidence that was not processed:

- The evidence labeled E1 was examined and determined not to be conducive to latent print processing and/or retention.
- The evidence labeled E1 was not processed due to the ASCL case management guidelines.
- The evidence labeled E1 was returned without processing. If additional analysis is required, please re-submit the evidence under the same ASCL case number.

7.8.10.3 LATENT-TO-LATENT COMPARISONS

Latent-to-latent comparisons of friction ridge skin impressions are not conducted on a routine basis and any request for latent-to-latent comparisons must be coordinated with and approved by the Latent Print Section Chief.

- If approved to conduct a latent-to-latent comparison, only positive conclusions are reportable. AFIS should be used in these types of examinations to assist with large volume searches.
- No conclusions will be reached and reported regarding any negative findings.
- Latent prints unsuitable for identification will not be compared with other latent prints.
- Examples of conclusions rendered in latent-to-latent comparisons are as follows:
 - The latent prints in this case are not suitable for latent-to-latent comparisons.
 - The latent fingerprints on Item(s) 1A and 1B were made by the same source.
 - The latent print on Item 1A in this case was identified as having been made by the same source as the latent print on Item 2C in case number ____ during an AFIS search, but the source was not identified.
 - No conclusion can be made regarding the remaining latent prints on Item(s) 1A through 1C in this case as they are not suitable for a latent-to-latent comparison.

7.8.10.4 REPORT/TESTIMONY ON ANOTHER ANALYST'S WORK

Latent Print analysts/technicians issuing a report based on the examination records generated by another individual shall complete and document a review of all relevant pages of documentation in the case record. This will be conducted by the reporting analyst/technician and will include initialing and dating each page of the examination record and the use of a review statement (e.g., "SOP compliant"/Examiner Initials/ Date) to be documented at minimum on the first or last page of the examination records.

The same documented review shall be conducted in the cases that both a Latent Print Technician and a Latent Print Examiner have produced examination records. This review statement should be documented by the Latent Print Examiner to include compliance with the discipline SOP and initialed and dated. (e.g., "SOP compliant"/Examiner Initials/Date). The Latent Print Examiner shall initial each examination record completed by the Latent Print Technician in the case file.

If examination records are generated in Foray, Latent Print analysts/technicians issuing a report or additional documentation based on the examination records generated by another individual shall complete and document a review of all relevant pages in the case record. This review shall be documented by the Latent Print Examiner using the *LP Examination Record Review Form* (LP-FORM-32) and included in the case record.

Latent Print analysts/technicians testifying based on the examination records generated by another individual shall complete a *Court Case Review Form* (ASCL-FORM-57) on the particular case prior to testifying.

7.8.11 TESTIMONY GUIDELINES

GUIDELINES FOR TESTIMONY BY PERSONNEL IN THE LATENT PRINTS SECTION

The following are qualifications and limitations of testimony in the field of Latent Prints. An examiner may offer any of the following conclusions:

- 1) Source Identification: A 'source identification' is the statement of an examiner's opinion that the probability that the two impressions were made by different sources is so small that it is negligible. A 'source identification' is not based on statistically-derived or verified measurement or actual comparison of all friction ridge skin impressions features in the world's population.
 - 2) Source Exclusion: 'Source exclusion' is an examiner's conclusion that two friction ridge skin impressions did not originate from the same source. The basis for a 'source exclusion' is an examiners decision that there are sufficient friction ridge skin features in disagreement to conclude that the two impressions came from different sources.
 - 3) Inconclusive: 'Inconclusive' is an examiner's conclusion that there is insufficient quantity and/or clarity of corresponding friction ridge skin features between two impressions such that the examiner is unable to identify or exclude the two impressions as originating from the same source. The basis for an 'inconclusive' conclusion is an examiner's decision that a 'source identification' or 'source exclusion' cannot be made due to insufficient information in either of the two impressions examined.
- An examiner shall not assert that two friction ridge skin impressions originated from the same source to the exclusion of all other sources or use the terms 'individualize' or 'individualization'. This may wrongly imply that a 'source identification' conclusion is based upon a statistically-

derived or verified measurement or actual comparison to all other friction ridge skin impression features in the world's population, rather than the examiner's expert opinion.

- An examiner shall not use the expressions 'reasonable degree of scientific certainty,' 'reasonable scientific certainty,' or similar assertions of reasonable certainty in either reports or testimony unless required to do so by a judge or applicable law.
- An examiner shall not cite the number of forensic latent print examinations performed in his or her career as a direct measure for the accuracy of a proffered conclusion. An examiner may cite the number of forensic latent print examinations performed in his or her career qualifications or experience.
- An examiner shall not assert that a forensic latent print examination is infallible or has a zero error rate.
- An examiner shall not provide a conclusion that includes a statistic or numerical degree of probability except when based on relevant and appropriate data.

7.8.11.1 REFERENCES

Department of Justice Uniform Language for Testimony and Reports for the Forensic Latent Print Discipline, *United States Department of Justice*, 15 August 2020

7.9 COMPLAINTS

7.9.1 GENERAL

See *ASCL Quality Manual* (ASCL-DOC-01).

7.9.2 TRANSPARENCY OF PROCESS

See *ASCL Quality Manual* (ASCL-DOC-01).

7.9.3 COMPLAINT PROCESS

See *ASCL Quality Manual* (ASCL-DOC-01).

7.9.4 RESPONSIBILITY

See *ASCL Quality Manual* (ASCL-DOC-01).

7.9.5 COMMUNICATION

See *ASCL Quality Manual* (ASCL-DOC-01).

7.9.6 INDEPENDENT EVALUATION

See *ASCL Quality Manual* (ASCL-DOC-01).

7.9.7 NOTICE OF COMPLETION

See *ASCL Quality Manual* (ASCL-DOC-01).

7.10 NONCONFORMING WORK

7.10.1 GENERAL

See *ASCL Quality Manual* (ASCL-DOC-01).

7.10.1.1 SIMPLE CORRECTION

See *ASCL Quality Manual* (ASCL-DOC-01).

7.10.1.2 LEVEL 2 NONCONFORMITY

See *ASCL Quality Manual* (ASCL-DOC-01).

7.10.1.3 LEVEL 1 NONCONFORMITY

See *ASCL Quality Manual* (ASCL-DOC-01).

7.10.2 RECORDS OF NONCONFORMING WORK

See *ASCL Quality Manual* (ASCL-DOC-01).

7.10.3 CORRECTIVE ACTION IMPLEMENTATION

See *ASCL Quality Manual* (ASCL-DOC-01).

7.11 CONTROL OF DATA AND INFORMATION MANAGEMENT

7.11.1 ACCESS TO INFORMATION

See *ASCL Quality Manual* (ASCL-DOC-01).

7.11.2 LIMS VALIDATION

See *ASCL Quality Manual* (ASCL-DOC-01).

7.11.2.1 LABORATORY-DEVELOPED SOFTWARE

See *ASCL Quality Manual* (ASCL-DOC-01).

7.11.3 LIMS REQUIREMENTS

See *ASCL Quality Manual* (ASCL-DOC-01).

7.11.4 OFF-SITE LIMS

See *ASCL Quality Manual* (ASCL-DOC-01).

7.11.5 LIMS DOCUMENTATION

See *ASCL Quality Manual* (ASCL-DOC-01).

7.11.6 CALCULATIONS AND DATA TRANSFERS

See *ASCL Quality Manual* (ASCL-DOC-01).

7.11.6.1 CALCULATION AND DATA TRANSFER RECORDS

See *ASCL Quality Manual* (ASCL-DOC-01).

8 MANAGEMENT SYSTEM REQUIREMENTS

8.1 OPTIONS

See *ASCL Quality Manual* (ASCL-DOC-01).

8.1.1 GENERAL

See *ASCL Quality Manual* (ASCL-DOC-01).

8.1.2 OPTION A

See *ASCL Quality Manual* (ASCL-DOC-01).

8.1.3 OPTION B

See *ASCL Quality Manual* (ASCL-DOC-01).

8.2 MANAGEMENT SYSTEM DOCUMENTATION (OPTION A)

8.2.1 POLICIES AND OBJECTIVES

See *ASCL Quality Manual* (ASCL-DOC-01).

8.2.1.1 REQUIREMENT FOR WRITTEN EVIDENCE

See *ASCL Quality Manual* (ASCL-DOC-01).

8.2.2 MISSION AND QUALITY POLICY STATEMENTS

See *ASCL Quality Manual* (ASCL-DOC-01).

LATENT PRINTS

Develop and preserve latent prints on evidence items submitted to the laboratory by applying the appropriate method(s). Compare unidentified latent prints to the known prints of individuals in order to identify or exclude potential sources. Utilize the available database(s) (AFIS/NGI) to search unidentified latent prints, compare search results, print known records and store prints.

8.2.3 COMMITMENT TO MANAGEMENT SYSTEM

See *ASCL Quality Manual* (ASCL-DOC-01).

8.2.4 DOCUMENTATION

See *ASCL Quality Manual* (ASCL-DOC-01).

8.2.5 ACCESSIBILITY

See *ASCL Quality Manual* (ASCL-DOC-01).

8.3 CONTROL OF MANAGEMENT SYSTEM DOCUMENTS (OPTION A)

8.3.1 CONTROLLED DOCUMENTS

See *ASCL Quality Manual* (ASCL-DOC-01).

8.3.2 CONTROLLED DOCUMENT POLICIES AND PROCEDURES

See *ASCL Quality Manual* (ASCL-DOC-01).

Any external documents (i.e. reference material, computer software) will be stored in the discipline S:drive, AFIS room, Latent Print Storage Room, or on Qualtrax

8.3.2.1 DOCUMENT APPROVAL

See *ASCL Quality Manual* (ASCL-DOC-01).

8.3.2.2 DOCUMENT REVIEW

See *ASCL Quality Manual* (ASCL-DOC-01).

8.3.2.3 DOCUMENT REVISION

See *ASCL Quality Manual* (ASCL-DOC-01).

8.3.2.4 DOCUMENT AVAILABILITY

See *ASCL Quality Manual* (ASCL-DOC-01).

8.3.2.5 DOCUMENT IDENTIFICATION

See *ASCL Quality Manual* (ASCL-DOC-01).

8.3.2.6 DOCUMENT OBOLESCENCE

See *ASCL Quality Manual* (ASCL-DOC-01).

8.4 CONTROL OF RECORDS (OPTION A)

8.4.1 RECORDS

See *ASCL Quality Manual* (ASCL-DOC-01).

The Latent Print section's quality records will be stored in Qualtrax.

8.4.2 RECORD POLICIES AND PROCEDURES

RECORD RETENTION

See *ASCL Quality Manual* (ASCL-DOC-01).

Historical non-electronic case files for the Latent Print section are stored in the file rooms located in the annex, or off-site storage. The electronic case files are located in the LIMS.

CONFIDENTIALITY

Investigative information on a particular item may not be released until verification has been completed.

8.5 ACTIONS TO ADDRESS RISKS AND OPPORTUNITIES (OPTION A)

8.5.1 RISKS AND OPPORTUNITIES (OPTION A)

See *ASCL Quality Manual* (ASCL-DOC-01).

8.5.1.1 HEALTH AND SAFETY

See *ASCL Quality Manual* (ASCL-DOC-01).

8.5.2 PLANNING

See *ASCL Quality Manual* (ASCL-DOC-01).

8.5.3 PROPORTIONALITY

See *ASCL Quality Manual* (ASCL-DOC-01).

8.6 IMPROVEMENT (OPTION A)

8.6.1 IMPROVEMENT

See *ASCL Quality Manual* (ASCL-DOC-01).

8.6.2 EXTERNAL FEEDBACK

See *ASCL Quality Manual* (ASCL-DOC-01).

8.7 CORRECTIVE ACTIONS (OPTION A)

8.7.1 NONCONFORMITIES

See *ASCL Quality Manual* (ASCL-DOC-01).

8.7.2 PROPORTIONALITY

See *ASCL Quality Manual* (ASCL-DOC-01).

8.7.3 RECORDS

See *ASCL Quality Manual* (ASCL-DOC-01).

8.8 INTERNAL AUDITS (OPTION A)

8.8.1 INTERNAL AUDITS

See *ASCL Quality Manual* (ASCL-DOC-01).

8.8.1.1 SCHEDULE

See *ASCL Quality Manual* (ASCL-DOC-01).

8.8.2 AUDIT POLICIES AND PROCEDURES

See *ASCL Quality Manual* (ASCL-DOC-01).

8.9 MANAGEMENT REVIEWS (OPTION A)

8.9.1 MANAGEMENT REVIEW

See *ASCL Quality Manual* (ASCL-DOC-01).

8.9.1.1 TIMEFRAME

See *ASCL Quality Manual* (ASCL-DOC-01).

8.9.2 INPUTS

See *ASCL Quality Manual* (ASCL-DOC-01).

8.9.3 OUTPUTS

See *ASCL Quality Manual* (ASCL-DOC-01).

9 TEST METHODS

9.1 PROCESSING METHODS

This section provides standard procedures for processing evidence done by a Latent Print analyst/technician.

9.1.1 INTRODUCTION

Evidence that is submitted to the laboratory for latent print processing varies. Methods are available to process non-porous and porous surfaces. The goals of processing evidence are the possible development of any ridge detail and preservation for any sufficient prints observed. The methods that are utilized are chosen by the analyst/technician working the case. Exceptions do occasionally occur due to the nature of evidentiary items or case circumstances; however, proper order should be followed when possible. Variations in different latent print processing or development methods can influence variations in appearances of the ridge detail that is present.

9.1.2 SAFETY CONSIDERATIONS

These procedures may involve hazardous materials, operations, and equipment. These procedures do not purport to address all of the safety problems associated with their use. It is the responsibility of the user of these procedures to establish appropriate safety and health practices and determine the applicability and normal limitations prior to use. Proper caution must be exercised and the use of personal protective equipment must be considered. Personal protective equipment includes, but is not limited to: lab coats, latex or nitrile gloves, and safety glasses. Proper caution should include strict adherence to the *ASCL Health and Safety Manual* (ASCL-DOC-08). The ASCL shall use test methods that meet the needs of the customer and are appropriate for the tests undertaken. The most current version of the method must be documented and readily available to the analyst for reference unless it is not appropriate or possible to do so.

9.1.3 EXAMINATION DOCUMENTATION

Examination documentation must adhere to the requirements described in the *ASCL Quality Manual* (ASCL-DOC-01). Appropriate notes should be taken that would allow another examiner to review and interpret the data and come to the same conclusions as well as to be able to repeat analysis in conditions as close to the original as possible. Notes shall be documented on an appropriate worksheet found either in Qualtrax or JusticeTrax.

9.1.4 COLLECTION OF DNA SWABS

Collection of transfer DNA swabs from evidence items will be conducted as requested or as deemed necessary. When appropriate, the analyst/technician should consider contacting the Physical

Evidence or DNA section to determine if further examination is necessary. During DNA collection, the analyst/technician shall:

- Wear gloves and a mask to prevent contamination of the evidence item.
- Clean the work area with 10% bleach solution.
- Lay down clean butcher paper.
- Lightly moisten a swab with distilled water.
- Swab surfaces of the evidence item that are likely to retain DNA.
- Allow the swabs to air dry and then package the swabs in a coin envelope.
- Any swabs taken from an item of evidence will be documented in the examination notes for that item.

In JusticeTrax, itemize and de-containerize an envelope under the parent item to hold the swab envelopes. Then individually itemize the swab envelopes under the evidence item and show their location as being in the de-containerized envelope. Swabs will be stored temporarily in the FD/LP secure storage area. The swabs will be transferred as needed to the DNA section for long term storage.

9.1.5 ALTERNATE LIGHT SOURCES

9.1.5.1 INTRODUCTION

The use of alternate light sources in conjunction with various chemical techniques and dyes has proven very effective in visualizing latent impressions. Substances found in latent print residue may luminesce when illuminated by the proper wavelength of light and viewed with the appropriate filters. Various contaminants such as cosmetics may become part of latent print residue and may inherently luminesce as well. Additionally, certain materials such as Styrofoam and galvanized or zinc plated metal are observed to consistently retain impressions that will luminesce without the application of chemical processing or dyes. This inherent luminescence allows for examination of items that may be destroyed by other techniques.

Proper safety precautions including avoiding skin exposure and proper eye protection with appropriate optical densities should be utilized when operating ultraviolet light sources or alternate light sources. Consult the appropriate user's manuals for the safe use and appropriate eye protection for the specific piece of equipment being utilized.

9.1.5.2 PREPARATIONS

No specific preparations required.

9.1.5.3 INSTRUMENTATION

- Rofin Polilight PL 400 located at the digital imaging/processing station in the AFIS room

9.1.5.4 MINIMUM STANDARDS AND CONTROLS

Not applicable.

9.1.5.5 PROCEDURE OR ANALYSIS

The procedure for this technique consists of examining the item with the alternate light sources using appropriate filtration. Common wavelengths used are 450 nm, 485 nm and 530 nm. In most cases an orange barrier filter is appropriate for examination. Some success may be seen with the use of ultraviolet light sources and the various wavelengths produced by alternate light sources. The examiner must choose the appropriate filters and eye protection for these light sources and the wavelengths selected.

9.1.5.6 INTERPRETATION OF RESULTS

Items can be examined for inherent luminescence without destruction of the item. Photographic preservation of developed impressions which may be of value for comparison is essential and must be accomplished as soon as possible. This non-destructive process is a relatively simple technique that has been proven to be successful in producing positive results.

9.1.5.7 REFERENCES

National Institute of Justice (U.S.). (2011). The Fingerprint Sourcebook. Washington, DC: U.S. Dept. of Justice, Office of Justice Programs, National Institute of Justice. Pg. 293-294

9.1.6 NINHYDRIN

9.1.6.1 INTRODUCTION

Ninhydrin, or triketo-hydrindene hydrate, is an extremely sensitive indicator of alpha-amino acids, proteins, peptides and polypeptides. The reaction produces a violet to blue-violet coloring of these substances and is effective even with older deposits and/or minute amounts of amino acids. While ninhydrin can be used on any surface, processing normally is confined to porous items which are not water-soaked and do not contain inherent animal proteins.

9.1.6.2 PREPARATIONS

Ninhydrin is readily soluble in most organic solvents. Working solutions of ninhydrin are governed by the nature of the solvent and the strength of the solution. Concentrations of the ninhydrin solution may vary according to application, but generally a 0.5% to 1.0% weight to volume mixture produces the best results. A 0.5% concentration is recommended for routine porous item processing. Ethanol, methanol, petroleum ether, and acetone have high damage potential but are acceptable for non-document porous material. Any of the listed solvents may be used at the examiner's discretion. Commercially prepared ninhydrin may be used; no specific preparation is needed.

Recommended Preparation: 0.5% concentration

9.1.6.2.1 PETROLEUM ETHER

CHEMICALS REQUIRED:

- 10 grams Ninhydrin crystals
- 60 mL Methanol
- 80 mL 2-Propanol (Isopropyl Alcohol)
- 1860 mL Petroleum Ether (fill measured beaker to the 2000 mL Level)

DIRECTIONS:

- 1) Dissolve Ninhydrin crystals in Methanol.
- 2) Add 2-Propanol to Ninhydrin/Methanol solution and stir.
- 3) Add Ninhydrin, Methanol, 2-Propanol solution to Petroleum Ether and stir.

9.1.6.2.2 ACETONE

CHEMICALS REQUIRED

- 25 grams Ninhydrin crystals
- 4 liters of Acetone

DIRECTIONS

- 1) Dissolve Ninhydrin crystals in Acetone.

9.1.6.2.3 STOCK SOLUTION

CHEMICALS REQUIRED

- 25 grams Ninhydrin crystals
- 300 mL Ethyl alcohol (use Absolute Ethanol, **not** Denatured Ethanol)

DIRECTIONS

- 1) Dissolve Ninhydrin crystals in Ethyl alcohol.

9.1.6.3 INSTRUMENTATION

A humidity chamber or a steam iron may be used to control the heat and relative humidity to accelerate the development of latent prints after processing.

9.1.6.4 MINIMUM STANDARDS AND CONTROLS

A test print is deposited on a non-evidentiary porous item, such as butcher paper or cardboard, to be used as a test item. The process described in the section below is used to process the test item. If ridge detail is observed on the test item after being processed then the solution can be used to process evidence. This testing procedure must be performed for each working solution at the time the solution is made. Documentation of this process must be noted in the Reagent Log by placing the date and initials of the preparer and the verifying analyst/technician, thus indicating a positive reaction with the test item. The batch number must be created by utilizing the reagent

abbreviation/month/day/year format of the date that the solution was made. If additional batches are made on the same day, add an alpha character to the lot number (#####a, b, c, etc.). The batch number must be placed on the original/working container. This test shall also be performed for each day that the reagent is needed. Documentation of this process will be entered in the Daily Reagent Verification log. Working solution shall be stored in a dark bottle and have a shelf life not exceeding one year.

9.1.6.5 PROCEDURE OR ANALYSIS

DIPPING

- 1) Completely immerse each item to be processed in the working solution until the item is completely saturated, usually five seconds or less. The item can be manipulated using tongs or forceps.
- 2) Remove and allow the item to dry completely.
- 3) Hovering a steaming iron over the item after drying can help accelerate development of ridge detail.
- 4) Check the item periodically to monitor the impression development. Care should be taken not to saturate the item with water vapor.

BRUSHING AND SPRAYING

Larger items which will not fit conveniently into processing trays can be saturated with the ninhydrin solution using a soft bristle paint brush. The items may also be processed by spraying. Spray the item until saturated and air dry; then follow the instructions detailed in the dipping procedure post drying.

9.1.6.6 INTERPRETATION OF RESULTS

Ninhydrin coloration is not permanent, and while some impressions have remained visible for years, others have faded in a matter of days. Photographic preservation of developed impressions which may be of value for comparison is essential and must be accomplished as soon as possible. Prints that have been developed with ninhydrin typically appear spotty due to the nature of the chemical reaction. Digital images of evidence that has been processed with ninhydrin will be scanned into the case file, when practical.

9.1.6.7 REFERENCES

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http://www.iowaiai.org/ninhydrin_basic_to_advanced.html

FBI Processing Guide for Developing Latent Print, 2000; http://onin.com/fp/fbi_2000_lp_guide.pdf

9.1.7 POWDERS

9.1.7.1 INTRODUCTION

Fingerprint powders are very fine particles with an affinity for moisture throughout a wide range of viscosity. Palmar sweat, grease, oil, and most contaminants that coat the surface of friction ridge skin possess sufficient moisture and viscosity to attract and bind the fine particles together. Contact between friction ridge skin and a non-porous surface will sometimes result in a transfer of the skin coating to that surface. The non-absorbency of the surface prevents penetration by the deposited moisture. All fingerprint powders are indiscriminate in adhesion to moisture. Surfaces coated with residue in addition to suspected latent prints will attract powders all over the surface.

Dependent upon the composition of the residue, the deposited moisture will range from a most apparent appearance to the barely perceptible or invisible, even under oblique lighting. Powder application is the effort to produce or improve the appearance for preservation.

The most effective agent in terms of adherence to moisture, non-adherence to dry surfaces, particle size, shape, uniformity, and intensity of color is carbon. Carbon is black, and as a result, black powders which contain carbon will consistently produce the best results. Most commercial black fingerprint powders have a high carbon base. According to the manufacturer's particular formula and production methods, the carbon base may be from a variety of sources, including lamp black, bone, or wood charcoal. Commercial powders contain milled carbon of highly uniform size and shape along with additional ingredients to preserve the milled condition and retard moisture absorption. Other colored powders may be required due to the substrate encountered, but should be restricted to absolute necessity.

Magnetic powders are powder-coated, fine iron filings subject to magnetic attraction. These adhere to moisture to a lesser degree than carbon powders, but can be applied with less destructive force to the surface.

Redwop fluorescent powders have a lycopodium base and were developed specifically to be luminescent-excited by light sources emitting blue-green light. Redwop fluorescent powder is

recommended as a primary use fluorescent powder for examination of latent prints with forensic light sources and ultraviolet light sources.

9.1.7.2 PREPARATIONS

No specific preparations are needed as the powders and materials being used are commercially prepared.

9.1.7.3 INSTRUMENTATION

DWS Downdraft Fingerprint Station

9.1.7.4 MINIMUM STANDARDS AND CONTROLS

The Standards and Controls for the Powders consist of insuring that the powders being used are in the proper condition. Powders should not be exposed to high humidity or moisture. Powders may clump if exposed to excessive moisture or contaminants. Moisture content and contaminants may be minimized by keeping the stock container closed as much as possible and using containers with small amounts of powder. This will minimize the moisture content as well as reduce any contamination of the stock container with substances from the item being processed. Any powder container shall be marked with the date opened and initialed by the person that opened it. Any powders that may be used for cross contamination prevention should be marked as such. The batch number shall be placed on the original and working container. Shelf life is indeterminable; however, if clumping of the powder is observed, it shall be discarded.

9.1.7.5 PROCEDURE OR ANALYSIS

STANDARD POWDERS

Powders may be applied by various means, but the preferred procedure for most items is the use of a brush. Fiberglass brushes are the easiest to use and maintain while permitting application over a wider area. Powders are more effective if applied in very small amounts. While some examiners prefer pouring a supply of powder into a secondary container or a piece of paper, direct contact between brush and powder container is acceptable. Only the ends of the brush bristles should be coated with the powder, and the brush should be gently tapped several times to remove all but a minimum amount.

With the brush handle in a nearly perpendicular position to the surface, the bristle ends are lightly and delicately moved over the surface. Discoloration of the latent print residue will usually appear immediately. With a fiberglass brush and a proper amount of powder, the impression will develop in density with each light pass until no further development can be observed. Even slightly excessive amounts of powder will cause a fill to occur between ridges. This fill must be removed with continued brush strokes until the impression is as free of extraneous powder as possible. Except on highly polished surfaces, excessive brushing is rare with a fiberglass brush. However, at the first indication that the impression is being removed, all further brushing must cease.

Extraneous residue on the surface may cause a general painting effect which obscures friction ridge detail. A lift made of the area can sometimes remove the extraneous material and permit a second application of powder. This second application may offer better contrast between latent print deposit and the background.

MAGNETIC POWDERS

Magnetic powder must be applied with a magnetic application device. Wands which contain a movable magnet attract the powder when the magnet is depressed and release the powder when it is raised. Contact between powder and surface is completed without bristles and is more light and delicate than the fiberglass brush. However, the particle size, larger than standard powder, has a tendency to paint some surfaces. Excessive powder can sometimes be removed by passing the magnetic wand without powder near the surface. Since the magnetic attraction holding the iron particles is relatively weak, the supply can be depleted quickly. Surface areas examined generally must be processed more slowly with magnetic powders, and great care must be exercised to prevent actual contact between the end of the wand and the surface.

REDWOP POWDER

Redwop powders are applied in the same manner as standard powders. It is not recommended to make a lift of the latent print but instead view with a light source. If lifting is desired, process with black powder and then lift.

9.1.7.6 INTERPRETATION OF RESULTS

Powder developed latent impressions which may be of value for comparison must be properly preserved. Experiments have revealed that the developed latent impressions have a weaker adhesion to the surface than undeveloped, and, as a result, are more susceptible to damage from accidental contact. Two methods of preservation are normally afforded the powder developed latent: photography and lifting.

Photographic preservation of developed impressions which may be of value for identification is essential and must be accomplished as soon as possible. Lifting is also an approved procedure but caution should be taken when lifting to insure that the lift will be successful. If the lift cannot be made with confidence that it will be successful, the developed friction ridge detail should be photographed prior to lifting.

9.1.7.7 REFERENCES

Cowger, James F. Friction Ridge Skin Comparison and Identification of Fingerprints; Boca Raton: CRC Press, 1993.

Lee, Henry C.; Gaensslen, R. E., eds. Advances in Fingerprint Technology; CRC Press LLC, Boca Raton, FL, 1994.

Olson, Robert. Scott's Fingerprint Mechanics; Charles C. Thomas Publisher: Springfield, IL, 1978.

Waldoch, Terry L. "The Flame Method of Soot Deposition for the Development of Latent Prints on Non-porous Surfaces"; Journal of Forensic Identification, 1993, 43, 5, 463-465.

9.1.8 CYANOACRYLATE (CA) ESTER FUMING

9.1.8.1 INTRODUCTION

Cyanoacrylate esters are the active ingredients in the super bond adhesives and are generally available according to the type of alcohols used in manufacturing. Most cyanoacrylates are methyl or ethyl esters. Regardless of type, the esters volatilize into long chain molecules with a positive electrical charge. In an atmosphere of relatively high humidity, the cyanoacrylate ester molecules are attracted to fingerprint residue and polymerize upon the deposit.

Properties of the polymer are dependent upon the type of cyanoacrylate ester used. Both ethyl and methyl esters produce a visible white coating. Ethyl ester polymers are softer and less durable while methyl ester polymers can usually only be removed with solvents. However, the durable, hard property of the methyl ester appears to inhibit dye applications.

Loctite and other brand name products contain a cyanoacrylate ethyl ester and have proven to be quite effective for fuming. Loctite 495 Super Bonder provides a liquid useful for heat acceleration techniques while Hard Evidence is a gel which reacts to exposure to air. Any product containing ethyl ester generally will be more effective when subsequent laser dye applications are indicated. Cyanoacrylate ester fuming is highly effective with nonporous items made of plastics or metal. It is superior to any other method for the processing of gun metal.

9.1.8.2 PREPARATIONS

No specific preparations are needed as the cyanoacrylate materials being used are commercially prepared.

9.1.8.3 INSTRUMENTATION

Air Science SafeFume™

9.1.8.4 MINIMUM STANDARDS AND CONTROLS

A test print is deposited on a non-evidentiary non-porous item to be used as a test item. The process described in the section below is used to process the test item. If ridge detail is observed on the test item after being processed then the solution can be used to process evidence. This test shall also be performed before each cycle of the chamber that contains evidence. Documentation of this process will be entered in the Daily Reagent Verification log. The batch number must be created by utilizing the reagent abbreviation/month/day/year format for the day that the bottle was opened. If additional batches are made on the same day, add an alpha character to the lot number (#####a, b, c, etc.). The batch number must be placed on the original/working container. Exposure of surfaces to a high concentration of fumes can result in overdevelopment which obscures impressions due to total surface polymerization. The shelf life is indeterminable and may be used as long as it remains in a semi-liquid state and has a positive reaction with the test item.

ATMOSPHERIC CHAMBER

Volatilization of cyanoacrylate ester at normal room temperature is relatively slow but is a viable procedure for evidence processing. Vapors must be contained, and a tank or plastic enclosure is most often used. A ratio of two drops of adhesive for every gallon of capacity or volume with relatively high humidity is usually effective. Polymerization may be retarded or prevented by low humidity. The addition of a cup of lukewarm water usually will improve the fuming results. Development time will vary with the temperature, humidity and the substrate being processed.

Application of heat greatly accelerates volatilization. Metal blocks or a hot plate can serve as the heat source but caution must be used not to overheat to the point where cyanide vapors can be produced. An aluminum dish or shaped foil may be placed on the hot surface and the adhesive poured onto the aluminum. A cup of warm water is placed in the enclosure. Volatilization can be very rapid and development may be accomplished. Care must be taken to closely observe the process to insure that the item is not overdeveloped.

An alternative, which offers rapid development time with minimum health risk, is to use a light bulb as the heat source. A standard light receptacle is added to the processing tank with a wire loop support fashioned to hold a watch glass approximately 1 inch above the light bulb. The adhesive is dropped onto the watch glass. A cup of warm water is placed in the enclosure if additional humidity is needed. Once the container is covered tightly, the light is turned on. Rapid volatilization does not begin until the heat from the bulb penetrates the watch glass. Natural convection currents aid dispersal of the fumes and development is generally accomplished in about 15 minutes.

VACUUM CHAMBER

A vacuum chamber using humidity and cyanoacrylate vapors @37C is a highly sensitive system to develop fingerprints on the inside of polyethylene bags, hand guns, long guns, gas cans, etc. Vacuum chambers are particularly effective on evidence that has a soot or oil film on the surface. Incubating dry fingerprints prior to CA fuming enhances the ridge detail.

9.1.8.5 PROCEDURE OR ANALYSIS

- 1) Place the evidence in the CA chamber, attempting to minimize its contact with any surface.
- 2) Ensure that the humidifier has adequate water.
- 3) Place approximately enough superglue to cover the bottom of the foil pan and place on top of the heating element.
- 4) Ensure the heating element is plugged in.
- 5) Secure the evidence in the chamber by locking the door.
- 6) Once the cycle starts, the chamber adjusts the conditions inside the instrument before starting a fifteen minute processing cycle.
- 7) After the processing cycle is complete, a seven minute purge cycle ensues to purge the vapors from the chamber.

9.1.8.6 INTERPRETATION OF RESULTS

Photographic preservation of developed impressions which may be of value for comparison is essential and must be accomplished as soon as possible. Once the latent impressions are recorded, further processing sometimes reveals impressions in which polymerization was too indistinct for visual notice or did not occur. Powders and particulate developers are effective and often permit additional photographic and lifting preservation. However, vinyl, rubber, oily guns, and hard plastics, especially those used in cash register drawers, may not be receptive to powders.

9.1.8.7 REFERENCES

Lee, Henry C.; Gaensslen, R. E., eds. *Advances in Fingerprint Technology*; CRC Press LLC, Boca Raton, FL, 1994.

Lennard, Christopher J.; Pierre A. Margot. "Sequencing of Reagents for the Improved Visualization of Latent Fingerprints"; *Journal of Forensic Identification*, September/October 1988, 38, 5, 197-210.

Lee, Henry C.; R. E. Gaensslen. "Cyanoacrylate Fuming"; *Identification News*, 1984, 34, 3, 8-14.

9.1.9 DYE STAINS

9.1.9.1 INTRODUCTION

Dye staining is used as a means of enhancing cyanoacrylate ester polymerized impressions. The dye stain is applied to a non-porous item that has been subjected to cyanoacrylate ester fumes. The dye stain is applied to the object and visually examined utilizing an alternate light source. The application of the dye stain enhances the latent developed with cyanoacrylate ester fumes to allow for visualization and photography. Each dye stain listed below will have different preparation steps and optimum viewing parameters.

9.1.9.2 RHODAMINE 6G

Rhodamine 6G fluoresces between 450 nm – 540 nm.

The examiner can choose from two preparations of Rhodamine 6G solutions. The preparation chosen is primarily dependent on the reaction of the substrate to the solvent used. A 0.01% to 0.001% Rhodamine 6G in methanol or isopropanol, weight to volume, is productive for most surfaces with methanol being the preferred solvent. Working solutions of Rhodamine 6G should be prepared in small amounts. Weaker solutions are recommended from the degree of background fluorescence. Aerosol spraying or fuming with Rhodamine 6G has been attempted with no consistent improvement in results, and are not recommended. Aqueous Rhodamine 6G solutions should be used when methanol or other organic solvents will be destructive to the surface being treated. If distilled water is not available deionized water may be used. The LP Section does not currently employ this aqueous solution in processing procedures, but should be included in this manual should a situation arise when destruction of evidence is a possibility with the Methanol Formula.

METHANOL FORMULA

- 4 grams of Rhodamine 6G

- 4 liters of methanol.

Combine the ingredients and continue to stir the solution until all of the powder is dissolved.

AQUEOUS FORMULA

- 4 grams of Rhodamine 6G
- 4 liter of distilled water.
- 3-6 drops of Synperonic N (optional)
 - Synperonic N is a surfactant which allows for a sheeting effect or more even covering of the item with the working solution.

Combine the ingredients and continue to stir the solution until all of the powder is dissolved.

9.1.9.3 INSTRUMENTATION

- Cyanoacrylate Fuming Chambers
- Rofin Polilight PL 400 located at the digital imaging/processing station in the AFIS room

Rhodamine 6G: examine the evidence using 450 nm to 540 nm light and view with orange goggles or red goggles.

Other wavelengths of light and goggle combination may provide better contrast and visualization of the latent print. The examiner should capture the best image possible using the available light source and filters.

9.1.9.4 MINIMUM STANDARDS AND CONTROLS

A test print is deposited on a non-evidentiary non-porous item to be used as a test item. The process described in the section below is used to process the test item. If ridge detail is observed on the test item after being processed then the solution can be used to process evidence. This testing procedure must be performed before each working solution at the time the solution is made. Documentation of this process will be entered in the Daily Reagent Verification log. The batch number must be created by utilizing the reagent abbreviation/month/day/year format for the day that the bottle was opened. If additional batches are made on the same day, add an alpha character to the lot number (#####a, b, c, etc.). The batch number must be placed on the original/working container. Exposure of surfaces to a high concentration of fumes can result in overdevelopment which obscures impressions due to total surface polymerization. The shelf life of the stock solution is indefinite, but the working solution shelf life is six months.

9.1.9.5 PROCEDURE OR ANALYSIS

Process the evidence as described in section 9.1.7.5.

All applications shall be done in a fume hood.

RHODAMINE 6G

- 1) Apply the solution to the item to be processed by immersion or squirt bottle.

- 2) Rinse the item with methanol and allow to dry.
- 3) Examine the item with the alternate light source at the appropriate wavelength, 450 nm – 540 nm, using the appropriate filters.

9.1.9.6 INTERPRETATION OF RESULTS

Photographic preservation of developed impressions which may be of value for comparison is essential and must be accomplished as soon as possible.

9.1.9.7 REFERENCES

Lennard, Christopher J.; Pierre A. Margot. "Sequencing of Reagents for the Improved Visualization of Latent Fingerprints"; Journal of Forensic Identification, September/October 1988, 38, 5, 197-210.

McCarthy, Mary M. "Evaluation of Ardrex as a Luminescent Stain for Cyanoacrylate Processed Latent Impressions"; Journal of Forensic Identification, 1990, 40, 2, 75-80.

Murbarger, Melissa, Lisa Zaccagnini, Substitute for Freon-Ardrex Formula. Illinois State Police Internal Publication, 1997; "Latent Impressions"; Journal of Forensic Identification, 1990, 40, 2, 75-80.

Lennard, Christopher J.; Pierre A. Margot. "Sequencing of Reagents for the Improved Visualization of Latent Fingerprints"; Journal of Forensic Identification, September/October 1988, 38, 5, 197-210.

Masters, Nancy E. "Rhodamine 6G: Taming the Beast"; Journal of Forensic Identification, September/October 1990, 40, 5, 265-270.

<http://www.cbdi.org/Reagents/by40.html>

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Menzel, E. Roland. "A Guide to Laser Latent Fingerprint Development Procedures"; Identification News, September 1983.

9.1.10 AMIDO BLACK

9.1.10.1 INTRODUCTION

Enhancement of impressions believed to be deposited in blood can be done through the application of a solution that results in a color change when in contact with alpha amino acids or proteins present in the blood. The suspected blood on the surface of the object should be dry prior to the processing with the selected solution. Application of a blood protein solution may prevent a serological exam of the evidence after staining. The type of surface and order for sequential processing is listed below in the Procedure or Analysis section for each stain.

NOTE: The Latent Print analyst/technician should consult with a serologist or DNA analyst prior to application of a solution if there is reason to believe the reagent process could be detrimental to subsequent DNA testing and results if worked before physical evidence.

9.1.10.2 PREPARATIONS

AMIDO BLACK

- 1) Dissolve 1.0 gram of amido black (Naphthol blue black) in 50 milliliters of glacial acetic acid.
- 2) Add 450 milliliters of methanol and thoroughly mix.
 - Rinse Option #1: Mix 50 milliliters of glacial acetic acid with 450 milliliters of methanol
 - Rinse Option #2: Mix 50 milliliters of glacial acetic acid with 950 milliliters of distilled or deionized water

9.1.10.3 INSTRUMENTATION

All applications should be done in a fume hood.

9.1.10.4 MINIMUM STANDARDS AND CONTROLS

Make a test impression on a non-porous, non-evidentiary item, by placing a small amount of blood (not human blood) on the item and allowing the blood to dry. Apply the selected solution to the item and if a blue-black stain observed, then the solution can be used to process evidence. This testing procedure must be performed for each working solution at the time the solution is made. Documentation of this process must be noted in the Reagent Log by placing the date and initials of the preparer and the verifying analyst/technician, indicating a positive reaction with the test item. The batch number must be created by utilizing the reagent abbreviation/month/day/year format of the date that the solution was made. If additional batches are made on the same day, add an alpha character to the lot number (#####a, b, c, etc.). The batch number must be placed on the original/working container. This test shall also be performed for each day that the reagent is needed. Documentation of this process will be entered in the Daily Reagent Verification log. The shelf life of Amido Black is indefinite.

9.1.10.5 PROCEDURE OR ANALYSIS

Amido black is a permanent procedure which can be used on porous or non-porous surfaces. Amido black can be applied after cyanoacrylate fuming in many cases (see McCarthy and Grieve, 1989).

- 1) Amido Black solution is applied to the item by immersing the item in the solution in a large tray, ensuring complete coverage of the area to be examined, or by using a squirt bottle.
 - a) The solution should be agitated before evidence application as well as during the immersion process.
- 2) Rinse with the selected solution followed by the second rinse solution of distilled or deionized water until the desired result is observed.

9.1.10.6 INTERPRETATION OF RESULTS

The blood impressions as well as other protein based impressions will be intensified and additional detail not previously visible may be revealed. Coloration is not permanent, and while some impressions have remained visible for years, others have faded in a matter of days. Photographic preservation of developed impressions which may be of value for comparison is essential and must

be accomplished as soon as possible. Dried impressions which lose contrast may be re-immersed in the second rinse solution and re-photographed.

9.1.10.7 REFERENCES

Cowger, James F. Friction Ridge Skin Comparison and Identification of Fingerprints; Boca Raton: CRC Press, 1993.

Lee, Henry C.; Gaensslen, R. E., eds. Advances in Fingerprint Technology; CRC Press LLC, Boca Raton, FL, 1994.

Lennard, Christopher J.; Pierre A. Margot. "Sequencing of Reagents for the Improved Visualization of Latent Fingerprints"; Journal of Forensic Identification, September/October 1988, 38, 5, 197-210.

Olson, Robert. Scott's Fingerprint Mechanics; Charles C. Thomas Publisher: Springfield, IL, 1978.

McCarthy, Mary M.; David L. Grieve. "Preprocessing with Cyanoacrylate Ester Fuming for Fingerprint Impressions in Blood"; Journal of Forensic Identification, 1989, 39, 1, 23-32.

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Norkus, P.; Kevin Noppinger. "New Reagent for the Enhancement of Blood Prints"; Identification News, 1986, 26, 4, 5 & 15.

9.1.11 GENTIAN VIOLET

9.1.11.1 INTRODUCTION

Gentian violet (crystal violet) is a sensitive stain which reacts with epithelial cells and other portions of latent print residue transferred upon surface contact. The presence of sebum appears to serve as an excellent transfer medium for sloughed epidermal cells and as a result gentian violet is usually effective on surfaces which readily hold the deposited sebum such as the adhesive side of tapes. The high sensitivity of gentian violet produces an immediate reaction upon skin contact; therefore, leak proof gloves are required for examinations. Accidental staining of hands is relatively harmless but usually cannot be de-stained. Disappearance of discoloration is a result of cell sloughing.

9.1.11.2 PREPARATIONS

Gentian violet working solution: 0.1% concentration preferred.

Higher concentrations are sometimes used, but increased amounts of gentian violet are difficult to dissolve and can create an increased background discoloration.

If distilled water is not available deionized water may be used.

Dissolve 1.0 grams of gentian violet in one liter of distilled water.

9.1.11.3 INSTRUMENTATION

None applicable.

9.1.11.4 MINIMUM STANDARDS AND CONTROLS

Dye stains, such as Gentian Violet, work by discoloring latent impressions composed of epithelial cells and sebum. A test print is deposited on a non-evidentiary piece of tape to be used as a test item. The process described in the section below is used to process the test item. If ridge detail is observed on the test item after being processed then the solution can be used to process evidence. This testing procedure must be performed for each working solution at the time the solution is made. Documentation of this process must be noted in the Reagent Log by placing the date and initials of the preparer and the verifying analyst/technician, indicating a positive reaction with the test item. The batch number must be created by utilizing the reagent abbreviation/month/day/year format. If additional batches are made on the same day, add an alpha character to the lot number (#####a, b, c, etc.). The batch number must be placed on the original/working container. This test shall also be performed for each day that the reagent is needed. Documentation of this process will be entered in the Daily Reagent Verification log. Shelf life is indefinite.

9.1.11.5 PROCEDURE OR ANALYSIS

- 1) Immerse item to be processed in the working solution in a large tray.
- 2) Allow the item to remain completely immersed for approximately 30 seconds while agitating.
- 3) Remove the item from the working solution and rinse excess stain from the item by washing with a gentle flow of cold tap water.
- 4) This process may be repeated until optimum contrast is reached between the impressions developed and the background.

9.1.11.6 INTERPRETATION OF RESULTS

Photographic preservation of developed impressions which may be of value for comparison is essential and must be accomplished as soon as possible. Stained impressions which fade as the tape dries may be improved by immersing the tape in a tray of clear water and photographing the impressions while the tape is submerged.

9.1.11.7 REFERENCES

Arima, T. "Development of Latent Fingerprints on Sticky Surfaces by Dye Staining or Fluorescent Brightening"; Identification News, February 1981.
Cowger, James F. Friction Ridge Skin Comparison and Identification of Fingerprints; Boca Raton: CRC Press, 1993.

9.1.12 STICKY SIDE TAPE POWDER

9.1.12.1 INTRODUCTION

The use of powder suspensions to develop impressions on the sticky side of tape has proven to be an effective alternative to the gentian violet technique. The use of powder suspensions to maximize contrast is the preferred technique on dark colored tapes lacking the availability of vacuum metal deposition. The consistent performance of powder suspensions on the adhesive side of tapes may,

in the future, relegate the gentian violet technique to a secondary role when processing the adhesive side of tapes.

9.1.12.2 PREPARATION

Combine standard black powder or Redwop fluorescent powder with tap water at a ratio of 1:1.

Add transparent dishwashing liquid (Ivory® works best) to the solution and stir until the mixture is the consistency of a thick paste.

9.1.12.3 INSTRUMENTATION

None applicable.

9.1.12.4 MINIMUM STANDARDS AND CONTROLS

A test print is deposited on a non-evidentiary piece of tape to be used as a test item. The process described in the section below is used to process the test item. If ridge detail is observed on the test item after being processed then the suspension can be used to process evidence. This test shall also be performed for each day that the reagent is needed. Documentation of this process will be entered in the Daily Reagent Verification log. Shelf life is not an issue as only amounts needed for the particular evidence are mixed and then discarded.

9.1.12.5 PROCEDURE OR ANALYSIS

- 1) Immerse item to be processed in the working suspension or paint the mixture on the sticky side of the tape using a soft bristled brush.
- 2) Allow the suspension to remain on the item for approximately 10 seconds.
- 3) Remove the item from the suspension and rinse excess suspension from the item by washing with a gentle flow of cold tap water.
- 4) This process may be repeated until optimum contrast is reached between the impressions developed and the background.

9.1.12.6 INTERPRETATION OF RESULTS

Photographic preservation of developed impressions which may be of value for comparison is essential and must be accomplished as soon as possible.

9.1.12.7 REFERENCES

Gray, M. Leanne. "Sticky-side Powder Versus Gentian Violet: The Search for the Superior Method for Processing the Sticky Side of Adhesive Tape"; *Journal of Forensic Identification*, 1996, 46, 3, 268-272.

Kimble, Gary W. "Powder Suspension Processing"; *Journal of Forensic Identification*, 1996, 46, 3, 273- 280.

9.1.13 GUN BLUEING

9.1.13.1 INTRODUCTION

Although many gun blueing formulations exist today, they essentially all work in a similar fashion. In short, blueing involves inducing an artificial rusting process using a specifically prepared oxidizing solution containing primarily selenous acid and copper sulfate. These two compounds are responsible for the final blue/black color. While the metal is in contact with the solution, copper and selenium are removed from the solution and deposited together on the surface of the metal, most likely as the alloy copper selenide (CuSe). The presence of any fingerprint residue on the metal surface inhibits the deposition of the dark colored alloy. The resulting fingerprint detail appears light against a dark colored metallic background.

9.1.13.2 PREPARATION

Combine Perma Blue® Liquid Gun Blue with tap water at a ratio of 1:1.

9.1.13.3 INSTRUMENTATION

None applicable.

9.1.13.4 MINIMUM STANDARDS AND CONTROLS

A test print is deposited on a non-evidentiary cartridge casing to be used as a test item. The process described in the section below is used to process the test item. If ridge detail is observed on the test item after being processed then the solution can be used to process evidence. This testing procedure must be performed for each working solution at the time the solution is made. Documentation of this process must be noted in the Reagent Log by placing the date and initials of the preparer and the verifying analyst/technician, indicating a positive reaction with the test item. The batch number must be created by utilizing the reagent abbreviation/month/day/year format. If additional batches are made on the same day, add an alpha character to the lot number (#####a, b, c, etc.). The batch number must be placed on the original/working container. This test shall also be performed for each day that the reagent is needed. Documentation of this process will be entered in the Daily Reagent Verification log. Shelf life is indefinite.

9.1.13.5 PROCEDURE OR ANALYSIS

- 1) Immerse the body of the casing to be processed in the working solution.
- 2) Agitate the casing in the solution for approximately 10-15 seconds while monitoring the oxidation process to prevent overdevelopment.
- 3) Remove the casing from the solution and stop the oxidation process by dipping the treated casing in a beaker of tap water.
- 4) This process may be repeated until optimum contrast is reached between the impressions developed and the background.

9.1.13.6 INTERPRETATION OF RESULTS

Photographic preservation of developed impressions which may be of value for comparison is essential and must be accomplished as soon as possible.

9.1.13.7 REFERENCES

Leben, D. A. (1997, January-March). Evaluation of Gun Blueing Solutions and Their Ability to Develop Latent Fingerprints on Cartridge Casings. *FDIAI NEWS*, 10-11.

9.2 EXAMINATION METHODS

This section provides standard procedures for examining latent prints by a Latent Print Examiner.

9.2.1 INTRODUCTION

Latent print lifts, photographs, and digital images that are collected by law enforcement officers from crime scenes are routinely submitted to the laboratory for examination. Examiner understanding of variations in appearances among prints is necessary before examination of a print takes place. Each independent print from the source will vary in appearance from every other independent print from the same source. Many factors influence the variations in appearances of prints. The manner in which friction ridge skin touches a substrate, and the substrate itself, influences the variations in appearance. The goals of examining latent print lifts, photographs, and digital images are to identify any ridge detail present, determine if the ridge detail is suitable for comparison, and compare the ridge detail to known tenprint and/or palm print records. Latent print examiners follow the ACE-V methodology described as: analysis, comparison, evaluation, and verification. It is important that this method is followed under all circumstances to mitigate any bias and ensure quality standards are upheld. Examiners describe features in prints by using three levels of detail: first, second, and third.

9.2.2 EXAMINATION DOCUMENTATION

Examination documentation must adhere to the requirements described in the *ASCL Quality Manual* (ASCL-DOC-01). Appropriate notes should be taken that would allow another examiner to review and interpret the data and come to the same conclusions as well as to be able to repeat analysis in conditions as close to the original as possible. Notes shall be documented on an appropriate worksheet found either in Qualtrax or JusticeTrax.

9.2.3 ANALYSIS

Analysis is the assessment of a print as it appears on the substrate. The analysis phase is where the suitability of the latent print is determined and sufficiency is verified. If the latent print(s) are deemed insufficient for comparison or there is no ridge detail present then the case does not move forward after verification by a second competent analyst/technician. Latent prints are analyzed to determine the amount of ridge detail, the number of minutiae, the clarity of the ridge detail, the orientation of ridge detail, and the origin of the ridge detail (finger, palm, etc.). The three levels of

detail are compiled in each latent print to determine the sufficiency of the print. All prints that are deemed sufficient for comparison are stored in Foray™ for further comparison, if needed. All latent print lifts (including those that are deemed insufficient or contain no ridge detail) are scanned into the JusticeTrax case file under the appropriate 'Request' folder.

9.2.3.1 FIRST LEVEL DETAIL

First level detail of friction ridge skin is the general overall direction of ridge flow in the print, not limited to a defined classification pattern. Every impression that is determined to be a friction ridge print has a general direction of ridge flow, or first level detail. General direction is shared by many sources, and is not considered to be unique on its own.

9.2.3.2 SECOND LEVEL DETAIL

Second level detail of friction ridge skin is the path of a specific ridge. The actual ridge path includes the starting position of the ridge, the path the ridge takes, the length of the ridge path, and where the ridge path stops. Second level detail is much more than the specific location of where a ridge terminates at a ridge ending or bifurcation. Level II detail is considered unique and is used by examiners to determine sufficiency as well as identifications or exclusions.

9.2.3.3 THIRD LEVEL DETAIL

Third level detail of friction ridge skin is the shape of the ridge structure. This level of detail encompasses the morphology of the ridge. The features of third level details are unique in their shapes, sequences, and configurations. Clarity of the print might limit an examiner's ability to perceive the third level detail. Level III detail is considered unique and is used by examiners to determine sufficiency as well as identifications or exclusions. Many factors, such as pressure, movement, and substrate affect how level III detail is recorded in an unknown impression or a known tenprint/palm print record.

9.2.3.4 GYRO

GYRO is a visual aid that examiners use to mark minutiae during latent print analysis and comparison so that another qualified examiner can determine what was done and interpret the data. GYRO allows an examiner to add weight and a level of confidence to the features that they have observed. The GYRO system, an acronym for Green-Yellow-Red-Orange, adds further information and transparency to the examination documentation.

An examiner should mark a feature with green when he or she is highly confident in the existence of the feature in the latent print. A green feature will then accordingly be given more weight during the comparison phase, the analyst will have a high expectation to see the green feature in the comparison phase, and the analyst's tolerance for how that feature will appear will be low.

An analyst should mark a feature with yellow when he or she has a medium level of confidence in the existence of the feature in the latent print. A yellow feature accordingly will have medium weight during the comparison phase, the analyst will have a medium level of expectation to see the feature, and a medium level of tolerance assigned to the feature.

An analyst should mark a feature with red when he or she has a great deal of uncertainty regarding the feature and has a very low level of confidence in the existence of the feature in the latent print and high tolerance for how the feature will appear in the exemplar. Red features should be given minimal weight during the comparison phase because of the significant uncertainty the analyst possessed regarding the presence of this feature and the increased range of tolerance that was allowed for this feature.

The color orange is used to represent features that were not observed initially in the analysis phase, but rather, were observed in the comparison phase. This allows the examiner to document the observance of the feature, but also increases transparency by indicating when the feature was observed.

A copy of the original latent print should be stored in Foray™, as well as a copy of the marked up print. It is not required that every latent print have markings for all minutiae present, a representative sample should be documented. The examiner should use GYRO as desired, but the documentation should be clear.

9.2.3.4.1 REFERENCES

Champod, C; Langenburg, G. The GYRO System – A Recommended Approach to More Transparent Documentation, *JFI*.

9.2.4 COMPARISON

The comparison phase is where an unidentified latent print, deemed sufficient for comparison, is directly compared to a known tenprint/palm print record. A determination is made whether the details in the unknown and known are in agreement based upon similarity, sequence, and spatial relationship. After determinations of actual agreement or disagreement of first, second, and/or third levels of details in the comparison phase, the analyst should proceed with an evaluation.

9.2.4.1 AFIS/NGI

The determination if the unidentified latent print is sufficient for the AFIS/NGI is based on the examiner's discretion. This decision is based on the numerous factors previously described. If the unidentified latent print is able to be searched in the AFIS/NGI then the search is conducted before a comparison is made to known records submitted with the case as evidence, or to individuals listed on the submission form. Typically, only sufficient prints that are involved in crimes against persons are searched in the NGI database. Any print searched in the AFIS/NGI must be directly compared to the match list generated by the database to determine if an identification can be made. If not, then the search is considered negative and the search must be verified before the case is complete.

9.2.4.2 INCOMPLETE RECORDS

If the known tenprint/palm print record(s) submitted by the agency or retrieved from the AFIS database are insufficiently recorded and cannot allow a complete comparison then the examiner

should request better known records to compare. In this circumstance, the unidentified latent print should be stored in Foray™ and a report should be issued indicating that better knowns are needed to allow a complete comparison.

9.2.5 EVALUATION

The evaluation is the formulation of a conclusion based upon analysis and comparison of friction ridge skin. The evaluation phase is where the examiner makes the final determination as to whether a finding of identification or exclusion can be made. The examiner cannot determine two prints originated from the same source with agreement of only first level details. The inability to determine actual disagreement does not result in a determination of identification. Instead, if no determination of sufficient agreement or disagreement of details can be made, an inconclusive determination is warranted.

9.2.5.1 PRECAUTIONS

The examiner needs to critically examine the prints while in each phase and understand the recurring, reversing, and blending potential of each phase. Biases can potentially influence the perceptions taking place in each phase. The examiner must resist using what is determined to be present in one print as justification for finding that detail in another print. The examiner must consciously apply each independent phase of ACE for each comparison.

9.2.6 VERIFICATION

The verification phase is the independent examination by another qualified examiner resulting in the same conclusion. The second examiner applies the ACE methodology between the unknown and known prints to determine if the same conclusion can be reached. Latent print examiners at the ASCL are required to get all evaluation decisions (identification, exclusion, and/or inconclusive) verified by a second qualified examiner. There are many methods of applying the verification phase of an examination. The method of verification must be selected so that the verifier is not improperly influenced by the original examiner's decisions. The verifier must be able to reach an unbiased conclusion. Documentation of verification should be clearly present on the examination records, including the latent print lift card(s), the known tenprint/palm print record(s), and the latent print worksheets. Chain of custody should be properly documented on the latent print worksheets.

9.2.6.1 BLIND VERIFICATION

One method of verification is blind verification. This method reduces the risk of confirmation bias; however, is the least efficient when it comes to turn-around-time. This method involves having the second examiner apply the ACE methodology between the unknown and known prints without indications of a previous conclusion. Conclusions made by the second examiner may confirm or refute the original conclusions of the first examiner. It should be clear in the examination documentation that the verification was blind.

9.2.6.2 NON-BLIND VERIFICATION

The most common form of verification is done by having the second analyst rework the case with indications of decisions made by the original examiner. Conclusions made by the second examiner may confirm or refute the original conclusions of the first examiner.

9.2.6.3 CONFLICT RESOLUTION

If the verifying examiner/technician refutes the original examiners conclusion(s) then a conflict resolution must take place. The suggested resolution is for each examiner to use the GYRO system for their analysis and comparison phases and then compare the markings on the images. If the two examiners cannot come to a mutual decision then a third examiner will conduct an independent analysis to assist in conflict resolution. If a conflict persists, the Latent Print Section Chief will conduct an independent analysis to make a final determination. If the final determination differs from the original examiner's conclusion then the case will be transferred into the custody of the Latent Print Section Chief and re-worked. Specific details of the conflict should be noted in the examination recorded, as well as the resolution to the conflict.