Latent Fingerprint Examiner
Training Manual

Idaho State Police Forensic Services
Identification Section

Latent Fingerprint Examiner
Training Manual

Rev.1
Issued 05-01-2001
Training Manual Latent Section

History Page

The original version of the Latent Fingerprint Examiner Training Manual was accepted July 10, 2000.

Revision 1, was revised from revision 0, and is effective May 1, 2001.

Approval
_____Date: _____

Approval
_____Date: _____

TABLE OF CONTENTS

Course of Instruction

1.0.0. Laboratory Introduction

2.0.0. Evidence Handling

3.0.0. Personal Identification Methods and Their Uses

4.0.0. History and Background of Fingerprint Identification

5.0.0. Fingerprint Classification System

6.0.0. Automated Fingerprint Identification System (AFIS)

7.0.0. Recording Inked Fingerprints, Palm Prints, and Footprints

8.0.0. Postmortem Identification

9.0.0. Sections and Services of the Crime Laboratory

10.0.0. Introduction to Latent Prints

11.0.0. Powder Development of Latent Prints

12.0.0. Chemical Development of Latent Prints

13.0.0. Alternate Light Source (ALS) Development of Latent Prints

14.0.0. Preservation of Latent Prints

15.0.0. Evaluation and Comparison of Latent Prints

16.0.0. Latent Print Section Case Management and Reporting

17.0.0. Preparation of Court Exhibits

18.0.0. Court Procedures and Related Laws

19.0.0. Student Internship

20.0.0. Student Progress Record

Appendix "A"

Recommended Readings for Latent Examiners

Appendix "B"

Recommended Training Courses for Latent Examiners

Overview of Training

Base training level for all Latent Print Examiners - minimum training requirements

1. All new latent print examiners will be assigned to another qualified latent print examiner who will act as their coach.

2. Students must pass a written test or practical exercises and/or an oral test on the

required objective.

3. Training usually lasts 11/2 to 3 years depending upon the progress of the examiner and their demonstrated aptitude and ability.

4. During the training phase, the courses listed at the end of this section are required and/or recommended depending upon availability.

5. During the training, all cases processed and examinations performed, including comparisons, will be double checked by the assigned coach or by another qualified latent examiner. All reports will also be co-signed by this examiner during the training phase.

6. An on-going process during the training phase should include reading of available books within the Latent Print Section and articles contained within the library. A listing of books and the articles that are required reading are listed at the back of this training manual.

7. During this training process, the trainee will accompany not only their coach but other trained latent examiners on field case processing. By allowing the trainee to accompany more than one latent print examiner, they will learn about the various techniques that each examiner possesses and develop their own style of crime scene processing.

8. The coach and the supervisor for the trainee will determine at what point the trainee will be able to process field cases on their own. Generally, they will usually accompany another examiner during the first year of the training phase or beyond depending upon their capabilities.

9. After a period of six months, the trainee can accompany examiners to court to gain exposure to expert testimony on latent prints.

10. After one year, the trainee will undergo moot court prepared by other latent print examiners to gain exposure to latent print testimony.

11. Any latent print training classes that are taught during the training phase will be observed by this trainee. After attending several of these classes, the trainee may be able to assist or even teach some of the training classes.

12. The trainee should keep a notebook of all their experience obtained during this training phase. This should include time spent working with inked prints, classes attended, classes instructed, court testimony observed, field

cases worked, all identifications made, and special projects completed during this training phase. These statistics will be a valuable aid for future court testimony.

13. It is encouraged that after six months of training/experience, he/she make application to become a member of the International Association for Identification (IAI) and the Pacific Northwest Division of IAI.

In addition, during the latent print examiner's approximate 11/2 to 3 year training phase, the following FBI classes must be completed if there is a class availability:

FBI Fingerprint Classification School - Approx. 40 hrs.

FBI Advanced Latent Fingerprint Techniques - Approx. 40 hrs.

FBI Administrative Advanced Latent Fingerprint School, FBI Academy Quantico, Virginia. Approx. 120 hrs.

FBI Latent Fingerprint Photography, FBI Academy Quantico, Virginia. Approx. 80 hrs.

A list of all recommended latent fingerprint training courses will be found in the Appendix "B" of this training manual.

Examiners Should be trained every year in methamphetamine drug lab processing and safety. They will be trained at the same time that the other methamphetamine drug lab site safety personnel are trained.

Also included in this training is the BCI AFIS training on the NEC Automated Fingerprint System.

1.0.0. Laboratory Introduction

Required Objectives:

1.1.0. An orientation to the Idaho State Police Forensic Services (FS).

1.2.0. An understanding of the organization structure, chain of command, and policies/procedures for FS.

1.3.0. An understanding of laboratory security and the need for confidentiality.

1.4.0. An understanding of the quality assurance/quality control guidelines for FS.

1.5.0. An understanding of the safety guidelines for FS.

2.0.0. Evidence Handling

Required Objectives:

2.1.0. The trainee will have an understanding of the case/evidence acceptance policy and evidence receiving procedures.

2.2.0. The trainee will have an understanding of evidence packaging and chain of custody.

2.3.0. The trainee will have an understanding of evidence handling, prevention of contamination, and documentation.

3.0.0. Personal Identification Methods and Their Uses

Required Objectives:

3.1.0. The trainee will have an understanding of early non-scientific methods of personal identification (scars, tattoos, sight recognition, uniform and dress, marks, and mutilations).

3.2.0. The trainee will have an understanding of scientific methods other than fingerprints (Bertillion system, handwriting, photography, DNA, and teeth).

3.3.0. The trainee will have an understanding of the basic foundations of the science of fingerprint identification-permanence and individuality (positive-infallible).

3.4.0. The trainee will have an understanding of the law enforcement value and civil use of fingerprints.

3.5.0. The trainee will have an understanding of the existence of various criminal (law enforcement) and civil fingerprint and footprint files (FBI criminal and civil, U.S. Military Medical Records-footprints, state and local fingerprint and palm print repositories).

4.0.0. History and Background of Fingerprint Identification

Required Objectives:

4.1.0. The trainee will have an understanding of the earliest recorded awareness of fingerprints (cliff dwellers-Chinese).

4.2.0. The trainee will have an understanding of early anatomical observations (Grew, Malpighi, Purkinje, et al).

4.3.0. The trainee will have an understanding of the biological significance of friction skin ridge patterns, their formation, and general considerations involved in ridge surface areas, presented so that the trainee is thoroughly familiar with the ridge structure of skin surfaces.

4.4.0. The trainee will have an understanding of the basic anatomy and terminology of the hands and feet as applicable to latent print identification.

4.5.0. The trainee will have an understanding of the scientific observation and uses leading to modern fingerprint identification (Herschel, Faulds, Galton, Vucetich, and Henry).

4.6.0. An understanding of the chronology of the introduction and use of fingerprints in the United States (Thompson, Twain, DeForest, Ferrier, NY Prison System, U.S. Navy and Army, FBI).

5.0.0. Fingerprint Classification System

Required Objectives:

5.1.0. An understanding of the Henry Classification System to include:

1. Origin
2. FBI extensions
3. Pattern interpretation
4. Parts of classification

5.2.0. An understanding of NCIC Classification System.

5.3.0. Attendance in an FBI fingerprint classification course.

6.0.0. Automated Fingerprint Identification System (AFIS)

Required Objectives:

6.1.0. An understanding of AFIS and the Western Identification Network (WIN).

6.2.0. An understanding of the capabilities and limitations of:

1. Inked print to inked print comparison system
2. Latent print to inked print comparison system
3. Inked print to latent print comparison system
4. Latent print to latent print comparison system

6.3.0. An understanding of the minimum prerequisites for a candidate latent print to be searched.

7.0.0. Recording Inked Fingerprints, Palm Prints, and Footprints

Required Objectives:

7.1.0. An understanding of the proper methods for recording inked/known fingerprints for criminal history/personal identification.

7.2.0. An understanding of the proper method for using ink and roller to record fingerprints, palm prints, and footprints (including equipment maintenance).

7.3.0. An understanding of the proper method of completing fingerprinting card information, sequence for recording fingers, and method of printing plain impressions.

7.4.0. An understanding of the proper method for recording major case prints.

7.5.0. Introductory knowledge of special chemical (inkless) systems for recording fingerprints.

7.6.0. Introductory knowledge of special electronic alternative systems for recording fingerprints.

8.0.0. Postmortem Identification

Required Objectives:

8.1.0. An understanding of the equipment used in the fingerprinting of

deceased persons.

8.2.0. An understanding of the effects and conditions of rigormortis and early stages of decomposition.

8.3.0. An understanding of the legal considerations and procedures for the removal of fingers or hands and subsequent preservation.

8.4.0. An understanding of the disaster squad services available from the FBI, Latent Fingerprint Section.

8.5.0. An understanding of equipment maintenance and personal safety considerations involving body fluid contamination, accidental puncture from needles, etc.

9.0.0. Sections and Services of the Crime Laboratory

Required Objectives:

9.1.0. An understanding of the capabilities, basic operating procedures, and manner in which latent print procedures interface with:

1. Forensic Document Examination
2. Firearms and Toolmarks
3. Forensic Photography
4. Chemistry / Toxicology
5. DNA
6. Serology
7. Microanalysis / Trace Evidence

9.2.0. An understanding of the proper procedures for completing forms, correspondence, and packaging of evidence to be forwarded to national or regional laboratories.

10.0.0. Introduction to Latent Prints

Required Objectives:

10.1.0. An understanding of the services offered by the Latent Print Section.

10.2.0. An understanding of the general chemical composition of human sweat as a means of understanding the composition of latent print residue.

10.3.0. An understanding of the infinite variables precluding "age" determination of latent prints in almost all instances.

10.4.0. An understanding of the potential for loss, contamination, and destruction of other types of forensic evidence (indented writing, body fluids, etc.) when more than one section/discipline is to process the same item of evidence.

10.5.0. An understanding of the professional duties, including moral obligations, of Latent Print Examiners working in the Latent Print Section.

10.6.0. An understanding of the personal safety hazards posed by pathogens (AIDS virus, hepatitis, etc.) present on body fluid contaminated evidence that is to be processed for latent prints. This includes proper work area disinfecting, procedures for handling needles and sharps, and use of personal protection clothing, gloves, etc.

10.7.0. Attendance in a latent fingerprint comparison course (example: FBI Advanced Latent Print Course).

10.8.0. Introductory knowledge concerning the quantitative parameters applied when evaluating latent impressions for identification purposes.

10.9.0. Introductory knowledge concerning the individual characteristics and unit spatial relationships involved in comparing known and latent impressions.

10.10.0. Introductory knowledge of various crime scene search techniques, including commonly prescribed searching sequences (grid, spiral, strip, etc.).

10.11.0. Introductory knowledge of the potential explosion, fire, and contamination safety hazards associated with latent print development powders, solvents and chemicals.

11.0.0. Powder Development of Latent Prints

Required Objectives:

11.1.0. An understanding of the basic types of brushes and their composition.

11.2.0. An understanding of surfaces and environmental factors determining brush and powder (type and color) selection.

11.3.0. An understanding of the proper procedures for using different types of hair, fiberglass, and magnetic brushes.

11.4.0. An understanding of equipment maintenance and safety procedures relative to powder development of latent prints.

11.5.0. Introductory knowledge of lifting tape, rubber lifters, hinge lifters, etc.

12.0.0. Chemical Development of Latent Prints

Required Objectives:

12.1.0. An understanding of the safety hazards associated with fumes, solvents, and chemicals used for development of latent prints.

12.2.0. An understanding of the latent print residue components targeted by different chemical development procedures.

12.3.0. An understanding of the evidentiary surface effects of various solvents on inks, plastics. etc.

12.4.0. An understanding of surface and environmental factors effecting selection and sequencing of chemical development procedures.

12.5.0. An understanding of chemical preservation, storage, application and post-application development procedures for:

1. Amido Black
2. DFO
3. Gentian Violet/Crystal Violet
4. Iodine Fuming
5. Ninhydrin
6. Physical Developer
7. Dye Stain Solutions (Rhodamine 6 G)
8. Small Particle Reagent
9. Sticky - Side Powder
10. Sudan Black
11. Cyanoacrylate Fuming

12.6.0. An understanding of equipment maintenance relative to chemical development of latent prints.

13.0.0. Alternate Light Source (ALS) Development of Latent Prints

Required Objectives:

13.1.0. An understanding of the personal safety hazards associated with Alternate Light Sources (ALS) and other electronic development of latent prints.

13.2.0. An understanding of dye stain procedures used for post-cyanoacrylate ALS processing.

13.3.0. An understanding of chemical enhancement procedures used for post-ninhydrin ALS processing.

13.4.0. An understanding of equipment maintenance relative to electronic development of latent prints.

13.5.0. Introductory knowledge of luminescence, fluorescence, inherent luminescence, light wavelengths, band-pass filters, and light delivery systems as they relate to ALS detection of latent prints.

14.0.0. Preservation of Latent Prints

Required objectives:

14.1.0. An understanding of latent print photography to include:

14.1.1.0. Equipment and Materials

1. Different types of cameras used for latent print photography.
2. Film
3. Filters
4. Lighting techniques

14.1.2.0. Photographic Procedures

1. Accuracy of image size
2. Exposure
3. Film development
4. Printing procedures

14.1.3.0. Use and maintenance of fingerprint cameras.

14.1.4.0. Photography of chemically developed latent prints of various colors.

14.1.5.0. Photography of latent prints developed with powders.

14.1.6.0. Photography of visible prints (patent, blood or paint contaminated, plastic, in putty or wax, etc.).

14.1.7.0. Color reversal

14.1.8.0. Position reversal

14.1.9.0. Enlargements

14.2.0. An understanding of latent print lifting techniques to include:

1. Transparent / frosted tape
2. Hinge lifters
3. Rubber lifters
4. Lift backing
5. Photography of latent lifts

14.3.0. An understanding of proper procedures for handling and marking physical evidence received for examination.

14.4.0. An understanding of proper procedures for packaging physical evidence for subsequent latent print examination without reducing its evidentiary value.

14.5.0. Introductory knowledge of ALS luminescence photography.

14.6.0. Introductory knowledge of More Hits Digital Image System.

14.7.0. Introductory knowledge of gelatin lifting devices.

14.8.0. Introductory knowledge of electrostatic lifting devices.

15.0.0. Evaluation and Comparison of Latent Prints

Required Objectives:

15.1.0. An understanding of the evaluation criteria for determining the identification value of fragmentary latent prints.

15.2.0. An understanding of the nature of individual ridge characteristics (dots, ridge endings, and bifurcation's) and the varying definitions assigned to combinations of those three ridge characteristics.

15.3.0. An understanding of the value of incipient ridge characteristics for use in latent print identification.

15.4.0. An understanding of the importance of elimination prints and the necessity for completing "elimination" comparisons before AFIS processing of latent prints.

15.5.0. An understanding of the value of ridge flow configuration (size, pattern, focal points, etc.), scars, creases, and poroscopic ridge characteristics in latent print comparisons.

15.6.0. An understanding of, and the ability to recognize, the appearance of latent fingerprints, palm prints, fragmentary (partial) impressions (and in some instances foot / toe prints) of value for identification.

15.7.0. An understanding of the nature of ridge color reversals (entire print) and changes (within the same print) encountered in latent print comparisons.

15.8.0. An understanding of the effects of pressure distortion, slippage, overlays, pre- and post- deposit artifacts (surface scratches, soil, brush strokes, etc.), and the ability to recognize and compensate for such disturbances/distortion.

15.9.0. An understanding of what is a valid identification and why no minimum "number" of matching ridge characteristics can be defined to effect an identification (i.e., positive opinion based on personal empirical experience in examining and comparing latent prints).

15.10.0. An understanding of the identification value of cumulative ridge characteristics in simultaneous (adjacent) latent fingerprints/toes.

15.11.0. Introductory knowledge of the nomenclature, operation, magnification powers, etc., of equipment used for latent print evaluation and comparison.

15.12.0. Introductory knowledge of the "Galton details".

16.0.0. Latent Print Section Case Management and Reporting

Required Objectives:

16.1.0. An understanding of proper procedures for maintaining evidence accountability (documentation and physical control).

16.2.0. An understanding of proper procedures for case file (note taking) recording of activities.

16.3.0. An understanding of proper procedures for reporting latent print examination findings in an accurate, concise, and clear manner.

17.0.0. Preparation of Court Exhibits

Required Objectives:

17.1.0 An understanding of court exhibit preparation procedures to include:

1. Use of the More Hits System to develop court charts
2. Print selection
3. Individual ridge characteristics selection for charting
4. Numbering sequence
5. Chart lettering/numbering

18.0.0. Court Procedures and Related L

Required Objectives:

18.1.0. An understanding of the proper procedure for presenting expert latent print testimony that:

1. Is accurate
2. Reflects knowledge of the science
3. Is understandable
4. Is believable

18.2.0. An understanding of the professional restrictions and legal obligation regarding answers to questions about possible, probable or likely identifications (qualified conclusions regarding

latent print comparisons).

18.3.0. An understanding of proper case preparation prior to appearance in court (work sheets, evidence, notes, reports, demonstrative exhibits).

18.4.0. An understanding of the value of pretrial conference with the attorney who will be conducting direct examination.

18.5.0. An understanding of proper courtroom demeanor (grooming, dress, walk, tone of voice, expression, speech, distracting mannerisms, pause before answering, etc.).

18.6.0. An understanding of courtroom operational procedures (swearing-in, depositions, preliminary hearings, voir dire, establishing foundation for exhibit admission, direct examination, cross examination, addressing the judge, etc.).

18.7.0. An understanding of the proper format and content for a curriculum vitae and the legal obligation to furnish it on request before trial.

19.0.0. Student Internship

Required Objectives:

19.1.0. A level of expertise at which the latent print trainer feels the trainee is competent in all phases relative to latent print examination, including professional attitude.

19.2.0. The ability to function alone, as a well trained latent print examiner. As such, it should be well understood that frequent consultation with other latent print examiners concerning difficult examinations, identifications, etc., is encouraged for the duration of one's career. Completion of the training program does not remove the moral requirement to resolve uncertainties involved in instances of difficult comparisons, examination, etc.

20.0.0. Student Progress Record

Courses of Instruction	Date / Initials of Reviewer
1.0.0. Laboratory Introduction	----------
2.0.0. Evidence Handling	----------
3.0.0. Personal Identification Methods and their Uses	----------
4.0.0. History and Background of Fingerprint Identification	----------
5.0.0. Fingerprint Classification System	----------
6.0.0. Automated Fingerprint Identification System	----------
7.0.0. Recording Inked Fingerprints, Palm Prints, and Footprints	----------
8.0.0. Postmortem Identification	----------
9.0.0. Sections and Services of the Crime Laboratory	----------
10.0.0. Introduction to Latent Prints	----------
11.0.0. Powder Development of Latent Prints	----------
12.0.0. Chemical Development of Latent Prints	----------
13.0.0. Alternate Light Source (ALS) Development of Latent Prints	----------
14.0.0. Preservation of Latent Prints	----------
15.0.0. Evaluation and Comparison of Latent Prints	----------
16.0.0. Latent Print Section Case Management and Reporting	----------

17.0.0. Preparation of Court Exhibits ----------

18.0.0. Court Procedures and Related Laws ----------

19.0.0. Student Internship ----------

20.0.0. Student Progress Record Cont.

Required Classes to Attend (Dependent upon availability)	Date Attended
FBI Fingerprint Classification School	_____
FBI Advanced Latent Fingerprint Tech.	_____
FBI Administrative Advanced Latents	_____
Demystifying Palm Prints	_____
Digital Image Workshop	_____
Advanced Ridgeology Comparison Tech.	_____
D.E.A. Clan Lab Safety Certification Course (Yearly Clan Lab Safety Training)	_____
P.O.S.T. Instructor Development Course	_____
Expert Witness Testimony Training	_____
Photography Training	_____

Appendix A Recommended Readings for Latent Examiners

Journal of Forensic Identification
by The International Association for Identification

Advances in Fingerprint Technology
by Henry C. Lee & R.E. Gaensslen

Quantitative - Qualitative Friction Ridge Analysis
An Introduction to Basic and Advanced Ridgeology
by David Ashbaugh

Fingerprint Techniques
by Andre A. Moenssens

Fingerprints and the Law
by Andre A. Moenssens

Scott's Fingerprint Mechanics
by Robert D. Olsen, Sr.

An Introduction to Lasers, Forensic Lights
and Fluorescent Fingerprint Detection Techniques
by Dr. E. Roland Menzel

Fingerprint, Palms and Soles
by Harold Cummins and Charles Midlo

Techniques of Crime Scene Investigation
by Berry A.J. Fisher

Criminal Investigation
Basic Perspectives
by Paul B. Weston & Kenneth M. Wells

Effective Expert Witnessing
by Jack V. Matson

Law for the Expert Witness

Daniel A. Bronstein

Forensic Image Tracking System
More Hits User Manual

Manual of Fingerprint Development Techniques
Police Science Development Branch
Home Office, UK.

Safety Guidelines
International association for Identification

The Science of Fingerprints
by the FBI

FBI Advanced Latent Fingerprint School text.
By the FBI

FBI Fingerprint Training Manual
by the FBI

Kodak Professional DCS Cameras
Quick Guide 12/05/96
Eastman Kodak Co.

Omniprint 1000A
Operating Instructions
Mell es Griot

Kodak Professional DCS 420 Digital Camera
User's Manual
Eastman Kodak Co. 1994

Nikon N90
Instruction Manual

Technical Notes
Lightning Powder Co.

Appendix B Recommended Training Courses for Latent Examiners

1. Fingerprint Classification
   FBI 40 hrs.

2. Advanced Latent Fingerprint Techniques and Chemical processing
   FBI 40 hrs.

3. Advanced Palm Print Identification
   International Association for Identification. 24 hrs.

4. Digital Image Workshop
   Forensic Identification Training seminars, Ltd. 40 hrs.

5. Advanced Ridgeology comparison Techniques
   Forensic Identification Training Seminars, Ltd. 40 hrs.

6. Mastering Expert Testimony
   Forensic Identification Training Seminars, Ltd. 40 hrs.

7. Rynerson & Chison Homicide Investigation School
   Location to be announced. 60 hrs.

8. Administrative Advanced Latent Fingerprint School
   FBI Academy Quantico, VA. 120 hrs.

9. D.E.A. Clan-Lab Certification Course
   Location to be announced. 40 hrs.

10. P.O.S.T. Instructor Development Course
    P.O.S.T. Meridian, ID 32 hrs.

11. Latent Fingerprint Photography
    FBI Academy Quantico, VA. . 80 hrs.

12. Basic Black & White Photography workshop
    Nicon/Kodak Law Enforcement Photography.

13. International Association for Identification Annual Education Conferences (Held Nationwide).

14. Pacific Northwest Division of IAI meetings and training conferences (Held in the Northwest).

15. International Association for Identification Latent Print Certification (CLPE).

16. Crime Scene Technician, (CST) Level I

17. Crime Scene Analyst, (CSA) Level II

18. Senior Crime Scene Analyst Level III

All class hours are approximated.

Training Record

Employee: _____

1.0.0. Laboratory Introduction

Required Reading		Completion Date / Reviewer / Trainee
a.	ISPFS SOP Manual	_____/_____/_____
b.	ISPFS Chemical Hygiene and Safety Plan	_____/_____/_____
c.	ISPFS Exposure Control Plan	_____/_____/_____
d.	Ident Section SOP Manual	_____/_____/_____

2.0.0. Evidence Handling

Required Reading		Completion Date / Reviewer / Trainee
a.	ISPBFS SOP Manual -review Evidence Handling	_____/_____/_____
b.	Ident Section SOP Manual Section 10.0.0, 16.1.0, 16.2.0, 16.3.0.	_____/_____/_____

Training Record

Employee: _____

3.0.0. Personal Identification Methods and Their Uses

Required Reading	Completion Date / Reviewer / Trainee
a. Scott's Fingerprint Mechanics, by Robert D. Olsen, Sr. Chapter 1, "Fingerprint Identification." Pages 5-14, 24-30.	_____/_____/_____
b. Fingerprint Techniques, by Andre Moenssens. Chapter 2, "The Nature of Friction Skin." Pages 60-63.	_____/_____/_____
c. Finger Prints, Palms and Soles, by Harold Cummins and Charlie Midlo. Chapter 8, "Elements of Finger-Print Identification." Pages 147-155.	_____/_____/_____
d. Criminalistics, by Richard Saferstein. Chapter 14, "Fingerprints."	_____/_____/_____
e. FBI Advanced Latent Fingerprint School. "Fingerprint Identification" Pages 3-30, "Single Fingerprint File" Pages 162-164, "Importance of Unidentified Latent Fingerprint File" Pages 165-166.	_____/_____/_____
f. Friction Ridge Skin, by James F. Cowger. Chapter 1, "Introduction" Pages 1-7.	_____/_____/_____

Training Record

Employee:_____

4.0.0. History and Background of Fingerprint Identification

Required Reading	Completion Date / Reviewer / Trainee
a. Fingerprint Techniques, Andre Moenssens. Chapter 1, "The History of Fingerprinting." Pages 1-26. Chapter 2, "The Nature of Friction Skin." Pages 27-63.	_____/_____/_____
b. Finger Prints, Palms and Soles, by Harold Cummins and Charles Midlo. Chapter 1, "History." Pages 3-21. Chapter 2, "General Considerations." Pages 22-42.	_____/_____/_____
c. Criminalistics, by Richard Saferstein. Chapter 14, "History of Fingerprints." Pages 437-439.	_____/_____/_____
d. Advances in Fingerprint Technology by Lee, Gaensslen. Chapter 1, "History and Development of Fingerprinting." Pages 1-38.	_____/_____/_____
e. FBI Advanced Latent Fingerprint School, by FBI. "Fingerprint Identification." Pages 6-11.	_____/_____/_____
f. Friction Ridge Skin, by James F Cowger, Chapter 1, pages 1-7.	_____/_____/_____
g. Fingerprints and The Law, by Andre A. Moenssens. Chapter 1, "History Perspective." Pages 1-9.	_____/_____/_____

Training Record

Employee: _____

5.0.0. Fingerprint Classification System

Required Reading	Completion Date / Reviewer/ Trainee

a. The Science of Fingerprints, by the FBI. Chapters 2-8. Pages 5-110. _____/_____/_____

b. Friction Ridge Skin, by James F. Cowger. Chapter 3, "Classification." Pages 34-70. _____/_____/_____

c. Fingerprint Techniques, by Andre A. Moenssens. Chapter 3, "Pattern Interpretation." Pages 64-101. _____/_____/_____

d. Fingerprint Techniques, by Andre A. Moenssens. Chapter 6, "Fingerprint Classification in the United States." Pages 158-173. _____/_____/_____

e. Scott's Fingerprint Mechanics, by Robert D. Olsen Sr., Chapter 1, Sections 7, 8, and 9, "Fingerprint Classification," "Space Value on Fingerprint Cards," "Fingerprint Patterns are Complex Yet Simple." Pages 17-21. _____/_____/_____

f. Criminalistics, by Richard Saferstein. Chapter 14, "Classification of Fingerprints." Pages 446-448. _____/_____/_____

g. Fingerprints and The Law, by Andre A. Moenssens. Chapter 2, "Fingerprint Principles and Techniques." Pages 10-23. _____/_____/_____

Training Record

Employee: _____

6.0.0. Automated Fingerprint Identification System (AFIS)

Required Reading — Completion Date / Reviewer / Trainee

a. Scott's Fingerprint Mechanics, by

Robert D. Olsen Sr. Chapter 8, Section 111, "Computer Identification of Latent Fingerprints." Pages 355-357. _____/_____/_____

b. Criminalistics, by Richard Saferstein. Chapter 14, "AFIS." Pages 448-450. _____/_____/_____

c. Advanced Fingerprint Technology, by Lee, Gaensslen. Chapter 6, "AFIS." Pages 163-190. _____/_____/_____

d. Local Latent Library Articles on AFIS. _____/_____/_____

e. Ident Section SOP Manual Section 19.1.0. Equipment. _____/_____/_____

Training Record

Employee: _____

7.0.0. Recording Inked Fingerprints, Palm Prints, and Footprints

Required Reading — Completion Date / Reviewer / Trainee

a. FBI Advanced Latent Fingerprint School. "Techniques for Taking Good Fingerprints." Pages 104-112. "Major Case Prints." Pages 167-172. _____/_____/_____

b. Scott's Fingerprint Mechanics, by Robert D. Olsen Sr. Chapter 2, "Taking Finger, Palm, and Footprints." Pages 55-101. _____/_____/_____

c. Fingerprint Techniques, by Andre A. Moenssens. Chapter 5, "Recording Prints." Pages 137-145. _____/_____/_____

d. The Science of Fingerprints, FBI. Chapter 9, "Techniques for Taking Good Fingerprints." Pages 111-115. Chapter 10, "Problems in Taking Inked Fingerprints." Pages 116-128. _____/_____/_____

e. Finger Prints, Palm and Soles, by Harold Cummins, Charles Midlo. Chapter 3, "Methods of Printing." Pages 45-55. _____/_____/_____

f. Friction Ridge Skin, by James F. Cowger. Chapter 2, "Taking Inked Prints." Pages 9-28. _____/_____/_____

g. Ident Section SOP Manual Sections 16.4.0, 16.5.0. _____/_____/_____

Training Record

Employee:_____

8.0.0. Postmortem Identification

Required Reading — Completion Date / Reviewer / Trainee

a. Friction Ridge Skin, by James F. Cowger. Chapter 2, "Printing the Deceased." Pages 28-33. _____/_____/_____

b. The Science of Fingerprints, FBI, Chapter 11, "Problems and Practices

in Fingerprinting the Dead."
Pages 129-156. _____/_____/_____

c. Fingerprint Techniques, by Andre A. Moenssens. Chapter 5, "Postmortem Fingerprinting." Pages 145-150. _____/_____/_____

d. Scott's Fingerprint Mechanics, by Robert D. Olsen Sr. Chapter 2, Section 30, "Postmortem Fingerprinting." Pages 84-89. _____/_____/_____

e. Local latent lab library articles on Fingerprinting deceased subjects and Latents on human skin. _____/_____/_____

Training Record

Employee: _____

9.0.0. Sections and Services of the Crime Laboratory

Required Reading — Completion Date / Reviewer / Trainee

a. Criminalistics, by Richard Saferstein. Chapter 1, "Introduction." Pages 1-27. _____/_____/_____

b. Forensic Science an Introduction to Criminalistics, by Deforest, Gaensslen, & Lee. Chapter 1, "About Forensic Science." Pages 1-27. _____/_____/_____

Training Records

Employee:_____

10.0.0. Introduction to Latent Prints

Required Reading	Completion Date / Reviewer / Trainee
a. FBI Advanced Latent Fingerprint School, By FBI. "Structure of Friction Skin." Page 113.	_____/_____/_____
b. The Science of Fingerprints, by FBI. Chapter 13, "Latent Impressions." Pages 170-172.	_____/_____/_____
c. Friction Ridge Skin, by James F. Cowger. Chapter 4, "The Evidence Print." Pages 71-109.	_____/_____/_____

d. Criminalistics, by Richard Saferstein. Chapter 14, "Fundamental Principles of Fingerprints." Pages 440-446. _____/_____/_____

e. Fingerprint Techniques, by Andre A. Moenssens. Chapter 4, "Latent Prints." Pages 102-106. _____/_____/_____

f. Scott's Fingerprint Mechanics, by Robert D. Olsen, Sr. Chapter 3, "Latent Fingerprints and Crime Scene Procedures." Pages 111-151. _____/_____/_____

g. Local latent lab library articles on latents and forgery of latents. _____/_____/_____

h. Techniques of Crime Scene Investigation, 5th edition. B. Fisher. Pages 86, 90, 93, 98-99. _____/_____/_____

i. Ident Section SOP Manual Section 6.0.0, 7.0.0, 8.0.0. _____/_____/_____

Training Record

Employee:_____

11.0.0. Powder Development of Latent Prints

Reading Requirement — Completion Date / Reviewer / Trainee

a. The Science of Fingerprinting, by FBI. Chapter 14, "Powdering and Lifting Latent Impressions." Pages 173-174. _____/_____/_____

b. FBI Advanced Latent Fingerprint School. "Development of Latent Impressions with Powders." Pages 122-126. _____/_____/_____

c. Friction Ridge Skin, by James F. Cowger. Chapter 4, "The Evidence Print." Pages 78-85. _____/_____/_____

d. Advances in Fingerprint Technology, by

Lee & Gaensslen. Chapter 3, "Methods of Latent Fingerprint Development." Pages 59-65. _____/_____/_____

e. Fingerprint Techniques, by Andre A. Moenssens. Chapter 4, "Latent Prints." Pages 106-114. _____/_____/_____

f. Scott's Fingerprint Mechanics, by Robert A. Olsen, Sr. Chapter 5, "Latent Fingerprint Powder Techniques." Pages 209-235. _____/_____/_____

g. Fingerprint and the Law, by Andre A. Moenssens. Chapter 2, Page 24. _____/_____/_____

h. Techniques of Crime Scene Investigation, 5th edition. B. Fisher. Pages 101-104, 112, 115. _____/_____/_____

i. Ident Section SOP Manual Section 15.0.0, 16.6.0, 17.1.0 , 17.2.0. _____/_____/_____

Training Record

Employee:_____

12.0.0. Chemical Development of Latent Prints

Required Reading	Completion Date / Reviewer / Trainee
a. Manual of Fingerprint Development Techniques, by Home Office Police Science Development Branch, London. Entire manual.	_____/_____/_____
b. FBI Advanced Latent Fingerprint School. "Chemical Development of Latent Impressions." Pages 131-136.	_____/_____/_____
c. The Science of Fingerprints, FBI. Chapter 15, "Chemical Development of Latent Impressions." Pages 175-186.	_____/_____/_____

d. Fingerprints and the Law, by Andre A. Moenssens. Chapter 2, Pages 24-26. _____/_____/_____

e. Fingerprint Techniques, by Andre A. Moenssens. Chapter 4. Pages 114-126. _____/_____/_____

f. Techniques of Crime Scene Investigation, 5th edition, by B. Fisher. Page 124. _____/_____/_____

g. Ident Section SOP Manual Section 19.3.0, 19.4.0, 19.5.0., Appendix "A" and "D." _____/_____/_____

Training Record

Employee:_____

12.5.1. Amido Black

Required Reading — Completion Date / Reviewer / Trainee

a. Scott's Fingerprint Mechanics, by Robert D. Olsen, Sr. Chapter 7, "Techniques for Latent Prints in Blood." Pages 323-324. _____/_____/_____

b. Advances in Fingerprint Technology, by Lee & Gaensslen. Chapter 3, "Enhancement of Bloody Fingerprints." Pages 83-87. _____/_____/_____

c. Local latent lab library articles on Amido black and blood prints. _____/_____/_____

d. Ident Section SOP Manual Section 17.9.0. _____/_____/_____

Training Record

Employee:_____

12.5.2. DFO

Required Reading	Completed Date / Reviewer / Trainee
a. Local latent lab library articles on DFO.	_____/_____/_____
b. Ident Section SOP Manual Section 17.5.0.	_____/_____/_____

Training Record

Employee: _____

12.5.3. Gentian Violet/Crystal Violet

Required Reading	Completion Date / Reviewer / Trainee
a. Advances in Fingerprint Technology by Lee, Gaensslen. Pages 70, 86, 88-89, 154.	_____/_____/_____
b. Local latent lab library articles on gentian violet.	_____/_____/_____
c. Ident Section SOP Manual Section 17.10.0.	_____/_____/_____

Training Record

Employee:_____

12.5.4. Iodine Fuming

Required Reading	Completion Date / Reviewer / Trainee
a. The Science of Fingerprints, FBI. "Iodine Method." Pages 175-177.	_____/_____/_____
b. Advances in Fingerprint Technology, by Lee, Gaensslen. Pages 60, 65-67, 89.	_____/_____/_____
c. Scott's Fingerprint Mechanics, by Robert D. Olsen Sr. Pages 243-256.	_____/_____/_____
d. Friction Ridge Skin, by James F. Cowger. Pages 93-96.	_____/_____/_____
e. Local latent lab library articles on iodine.	_____/_____/_____
f. Ident Section SOP Manual Section 17.3.0.	_____/_____/_____

Training Record

Employee:_____

12.5.5. Ninhydrin

Required Reading		Completion Date / Reviewer / Trainee
a.	The Science of Fingerprints, by FBI. "Ninhydrin Method." Pages 177-179.	_____/_____/_____
b.	Advances in Fingerprint Technology, by Lee & Gaensslen. "Fingerprint Development by Ninhydrin and its Analogues." Pages 104-127, 156.	_____/_____/_____
c.	Scott's Fingerprint Mechanics, by Robert D. Olsen Sr. Pages 273, 276-291.	_____/_____/_____
d.	Friction Ridge Skin, by James F. Cowger. Pages 96-98.	_____/_____/_____
e.	Local latent lab library articles on ninhydrin.	_____/_____/_____
f.	Ident Section SOP Manual Section 17.4.0.	_____/_____/_____

Training Record

Employee:_____

12.5.6. Physical Developer

Required Reading	Completion Date / Reviewer / Trainee
a. Chemical Formulas and Processing Guide for Developing Latent Prints, by FBI. Pages 35-38.	_____/_____/_____
b. Advances in Fingerprint Technology, by Lee, Gaensslen. Pages 37, 79-82, 95, 112-113.	_____/_____/_____
c. Local latent lab library articles on physical developer.	_____/_____/_____
d. Ident Section SOP Manual Section 17.6.0.	_____/_____/_____

Training Record

Employee:_____

12.5.7. Dye Stain Solutions (Rhodamine 6G)

Required Reading	Completion Date / Reviewer /Trainee
a. Local latent lab library articles on Rhodamine 6G, Fluorescent powders, and photography.	_____/_____/_____
b. Ident Section SOP Manual Section 17.8.0.	_____/_____/_____

Training Record

Employee:_____

12.5.8. Small Particle Reagent

Required Reading	Completion Date / Reviewer / Trainee
a. Advances in Fingerprint Technology by Lee & Gaensslen. Pages 82-83.	_____/_____/_____
b. Local latent lab library articles on small particle reagent.	_____/_____/_____
c. Ident Section SOP Manual Section 17.11.0.	_____/_____/_____

Training Record

Employee:_____

12.5.9. Sticky-Side Powder

Required Reading	Completion Date / Reviewer / Trainee
a. Local latent lab library articles on sticky side powder.	_____/_____/_____
b. Ident Section SOP Manual Section 17.2.0.	_____/_____/_____

Employee:_____

12.5.10. Sudan Black

Required Reading	Completion Date / Reviewer / Trainee
a. Advances in Fingerprint Technology, by Lee & Gaensslen. Page 37.	_____/_____/_____
b. Friction Ridge Skin, by James F. Cowger. "Locating, Developing, Preserving, and Collecting Evidence Prints." Page 104.	_____/_____/_____
c. Local latent lab library articles on sudan black.	_____/_____/_____
d. Ident Section SOP Manual 17.12.0.	_____/_____/_____

Employee:_____

12.5.11. Cyanoacrylate Fuming (Super-Glue)

Required Reading	Completion Date / Reviewer / Trainee
a. Advances in Fingerprint Technology by Lee & Gaensslen. Pages 37, 67-70.	_____/_____/_____
b. Local latent lab library articles on cyanoacrylate (super glue) fuming.	_____/_____/_____
c. Ident Section SOP Manual Sections 17.7.0, 19.7.0, 19.8.0.	_____/_____/_____

Training Record

Employee:_____

13.0.0. Alternate Light Source (ALS) Development of Latent Prints

Required Reading	Completion Date / Reviewer / Trainee
a. Friction Ridge Skin, by James F. Cowger. Pages 106-107.	_____/_____/_____
b. Scott's Fingerprint Mechanics, by Robert D. Olsen Sr., Pages 185-187, 229-231, 347-348.	_____/_____/_____
c. Advances in Fingerprint Technology, Lee & Gaensslen. Pages 89-91, 104, 115-124, 135-159.	_____/_____/_____
d. An Introduction to Lasers, Forensic Lights, and Fluorescent Fingerprint Detection Techniques, by A. Roland Menzel. Read the entire book.	_____/_____/_____
e. Local latent lab library articles on ALS.	_____/_____/_____
f. Ident Section SOP Manual Section 19.6.0.	_____/_____/_____

Training Record

Employee:_____

14.0.0. Preservation of Latent Prints

Required Reading	Completion Date / Reviewer / Trainee
a. Advances in Fingerprint Technology, by Lee & Gaensslen. Pages 63, 93.	_____/_____/_____
b. Fingerprint Techniques, by Andre A. Moenssens. Pages 109-112, 271-273, 150-157, 143, 135, 119-120, 136.	_____/_____/_____
c. Scott's Fingerprint Mechanics, by Robert D. Olsen Sr. Pages 369-395, 126-127, 133-135,139-141, 141-151, 175-177, 177-182, 218-219.	_____/_____/_____
c. FBI Advanced Latent Fingerprint School, by FBI. Pages 120-121, 127-130.	_____/_____/_____
e. Friction Ridge Skin, by James F. Cowger. Pages 76-78, 111-128, 85-88, 90-93.	_____/_____/_____
f. More Hits User Manual Forensic Image Tracking System. Read the entire book and Updates.	_____/_____/_____
g. Local latent lab library articles on photographing latent prints.	_____/_____/_____
h. Techniques of Crime Scene Investigation, 5th edition, by B. Fisher. Page 113-115.	_____/_____/_____
i. Ident Section SOP Manual Sections 9.0.0, 19.2.0.	_____/_____/_____

Training Record

Employee: _____

15.0.0. Evaluation and Comparison of Latent Prints

Required Reading	Completion Date / Reviewer / Trainee

a. Friction Ridge Skin, by James F. Cowger. Pages 129-206. _____/_____/_____

b. Finger Prints, Palms and Soles, by Harold Cummins and Charles Midlo. Read the entire book. _____/_____/_____

c. FBI Advanced Latent Fingerprint School by the FBI, Pages 87-92, 113. _____/_____/_____

d. Scott's Fingerprint Mechanics, by Robert D. Olsen Sr. Pages 5-46, 171-175. _____/_____/_____

e. Fingerprint Techniques, by Andre A. Moenssens. Pages 27-63, 86-88, 252-293, 294-301. _____/_____/_____

f. Advances in Fingerprint Technology, by Lee & Gaensslen. Pages 39-56. _____/_____/_____

g. Demystifying Palm Prints, by Ron Smith. Read the entire book. _____/_____/_____

h. Advanced Ridgeology Comparison Techniques, by Pat A. Wertheim. Read the entire book. _____/_____/_____

i. Local latent lab library articles on comparison. _____/_____/_____

j. Ident Section SOP Manual Section 7.0.0. _____/_____/_____

Training Record

Employee:_____

16.0.0. Latent Print Section Case Management and Reporting

Required Reading Completion Date / Reviewer / Trainee

a. Idaho State Police Forensic Services Procedures Manual. Chapter 5. Handling Casework. _____/_____/_____

b. Latent Section SOP Manual, Section 11.0.0 Case Work Documentation and Report Writing. _____/_____/_____

Training Record

Employee: _____

17.0.0. Preparation of Court Exhibits

Required Reading — Completion Date / Reviewer / Trainee

a. Scott's Fingerprint Mechanics, by Robert D. Olsen Sr.

Pages 437-442. _____/_____/_____

b. The Science of Fingerprints, by the FBI. Pages 193-196. _____/_____/_____

c. FBI Advanced Latent Fingerprint School by the FBI. Pages 221-223. _____/_____/_____

d. Local latent lab library articles on digital imaging. _____/_____/_____

e. Advances in Fingerprint Technology H. Lee & R. Gaensslen. Read the rest of the book. _____/_____/_____

Training Record

Employee:_____

18.0.0. Court Procedures and Related Laws

Required Reading — Completion Date / Reviewer / Trainee

a. Friction Ridge Skin, by James F. Cowger. Pages 207-210. _____/_____/_____

b. FBI Advanced Latent Fingerprint School

by the FBI. Pages 224-247. _____/_____/_____

c. Fingerprint Techniques, by Andre A. Moenssens. Pages 270-280. _____/_____/_____

d. Advances in Fingerprint Technology, by Lee & Gaensslen. Pages 242-264. _____/_____/_____

e. Fingerprints And The Law, by Andre A. Moenssens. Chapter 3-11 Pages 31-219. _____/_____/_____

f. Effective Expert Witnessing, by Jack V. Matson. Read the entire book. _____/_____/_____

g. Law for the Expert Witness, by Daniel A. Bronstein. Read the entire book. _____/_____/_____

h. Local latent lab library articles on courtroom testimony. _____/_____/_____

i. Ident Section SOP Manual Section 14.0.0. _____/_____/_____

Training Record

Employee:_____

19.0.0. Student Internship

19.1.0. Each trainee is required to keep a notebook documenting the following areas.

1. All field cases responded to and assisted in processing or completed on their own.

2. All court cases where they testified or where testimony was given by another examiner.

3. All moot courts in preparation for actual courtroom testimony on case work.

4. All cases where deceased prints were taken at the autopsy, at the scene, or those obtained within the lab setting.

5. All training classes instructed or assisted in instruction.

6. All classroom training received relating to latents.

19.2.0. The trainee needs to document the total number of cases worked as well as persons identified, prints identified, number of comparisons made, and AFIS hits.

Recording Inked Prints

Examiner - Initial space provided after you have discussed / explained / demonstrated your ability to your coach/trainer.

Coach - Initial space provided after the examiner has comprehended and demonstrated the operation to your satisfaction.

	Examiner	Coach
Date:_____	_____	_____

Recording Postmortem Prints

Examiner - Initial space provided after you have discussed / explained / demonstrated your ability to your coach/trainer.

Coach - Initial space provided after the examiner has comprehended/ demonstrated the operation to your satisfaction.

	Examiner	Coach
Date:_____	_____	_____

Injecting Postmortem Prints

Examiner - Initial space provided after you have discussed / explained / demonstrated your ability to your coach/trainer.

Coach - Initial space provided after the examiner has comprehended/ demonstrated the operation to your satisfaction.

	Examiner	Coach
Date:_____	_____	_____

Powder Development

Examiner - Initial space provided after you have discussed / explained/ demonstrated your ability to your coach/trainer.

Coach - Initial space provided after the examiner has comprehended/ and demonstrated the operation to your satisfaction.

	Examiner	Coach
Date:_____	_____	_____

Amido Black

Examiner - Initial space provided after you have discussed / explained / demonstrated your ability to your coach/trainer.

Coach - Initial space provided after the examiner has comprehended and demonstrated the operation to your satisfaction.

	Date	Examiner	Coach
	_____	_____	_____
Mixing of Chemical	_____	_____	_____
Physical Test and Examination	_____	_____	_____

DFO

Examiner - Initial space provided after you have discussed / explained / demonstrated your ability to your coach/trainer.

Coach - Initial space provided after the examiner has comprehended/ demonstrated the operation to your satisfaction.

	Date	Examiner	Coach
	_____	_____	_____
Mixing of Chemical	_____	_____	_____
Physical Test and Examination	_____	_____	_____

Gentian Violet/Crystal Violet

Examiner - Initial space provided after you have discussed / explained / demonstrated your ability to your coach/trainer.

Coach - Initial space provided after the examiner has comprehended/ demonstrated the operation to your satisfaction.

	Date	Examiner	Coach
Mixing of Chemical	_____	_____	_____
Physical Test and Examination	_____	_____	_____

Iodine Fuming

Examiner - Initial space provided after you have discussed / explained / demonstrated your ability to your coach/trainer.

Coach - Initial space provided after the examiner has comprehended/ demonstrated the operation to your satisfaction.

	Date	Examiner	Coach
Physical Test and Examination	_____	_____	_____
	_____	_____	_____

Ninhydrin

Examiner - Initial space provided after you have discussed / explained / demonstrated your ability to your coach/trainer.

Coach - Initial space provided after the examiner has comprehended/ demonstrated the operation to your satisfaction.

	Date	Examiner	Coach
Mixing of Chemical	_____	_____	_____
Physical Test and Examination	_____	_____	_____

Physical Developer

Examiner - Initial space provided after you have discussed / explained / demonstrated your ability to your coach/trainer.

Coach - Initial space provided after the examiner has comprehended/ demonstrated the operation to your satisfaction.

	Date	Examiner	Coach
Mixing of Chemical	_____	_____	_____
Physical Test and Examination	_____	_____	_____

Dye Stain Solutions (Rhodamine 6G)

Examiner - Initial space provided after you have discussed / explained / demonstrated your ability to your coach/trainer.

Coach - Initial space provided after the examiner has comprehended/ demonstrated the operation to your satisfaction.

	Date	Examiner	Coach
	_____	_____	_____
Mixing of Chemical	_____	_____	_____
Physical Test and Examination	_____	_____	_____

Small Particle Reagent

Examiner - Initial space provided after you have discussed / explained / demonstrated your ability to your coach/trainer.

Coach - Initial space provided after the examiner has comprehended/ demonstrated the operation to your satisfaction.

	Date	Examiner	Coach
Mixing of Chemical			
Physical Test and Examination			

Sticky - Side Powder

Examiner - Initial space provided after you have discussed / explained / demonstrated your ability to your coach/trainer.

Coach - Initial space provided after the examiner has comprehended/ demonstrated the operation to your satisfaction.

	Date	Examiner	Coach
Mixing of Chemical	_____	_____	_____
Physical Test and Examination	_____	_____	_____

Sudan Black

Examiner - Initial space provided after you have discussed / explained / demonstrated your ability to your coach/trainer.

Coach - Initial space provided after the examiner has comprehended/ demonstrated the operation to your satisfaction.

	Date	Examiner	Coach
Mixing of Chemical			
Physical Test and Examination			

Examiner - Initial space provided after you have discussed / explained / demonstrated your ability to your coach/trainer.

Coach - Initial space provided after the examiner has comprehended/ demonstrated the operation to your satisfaction.

	Date	Examiner	Coach
	_____	_____	_____
Physical Test and Examination	_____	_____	_____

Fluorescent Pigments, Dyes, Powders

Examiner - Initial space provided after you have discussed / explained / demonstrated your ability to your coach/trainer.

Coach - Initial space provided after the examiner has comprehended/ demonstrated the operation to your satisfaction.

	Date	Examiner	Coach
Mixing of Chemical	_____	_____	_____
Physical Test and Examination	_____	_____	_____

Alternate Light Source Examination

Examiner - Initial space provided after you have discussed / explained /

demonstrated your ability to your coach/trainer.

Coach - Initial space provided after the examiner has comprehended/ demonstrated the operation to your satisfaction.

	Date	Examiner	Coach
	_____	_____	_____
Physical Test and Examination	_____	_____	_____

Photography of Latent Prints

Examiner - Initial space provided after you have discussed / explained/ demonstrated your ability to your coach/trainer.

Coach - Initial space provided after the examiner has comprehended and demonstrated the operation to your satisfaction.

	Examiner	Coach
Date:_____	_____	_____

Evaluation of Latent Prints

Examiner - Initial space provided after you have discussed / explained/ demonstrated your ability to your coach/trainer.

Coach - Initial space provided after the examiner has comprehended and demonstrated the operation to your satisfaction.

	Examiner	Coach
Date:_____	_____	_____

Comparison of Latent Prints

Examiner - Initial space provided after you have discussed / explained/ demonstrated your ability to your coach/trainer.

Coach - Initial space provided after the examiner has comprehended and demonstrated the operation to your satisfaction.

	Examiner	Coach
Date:_____	_____	_____

Evidence Procedures and Preservation

Examiner - Initial space provided after you have discussed / explained/ demonstrated your ability to your coach/trainer.

Coach - Initial space provided after the examiner has comprehended and demonstrated the operation to your satisfaction.

Examiner	Coach

Date:_____ _____ _____

Latent Print Reports/Evidence Tracking System

Examiner - Initial space provided after you have discussed / explained/ demonstrated your ability to your coach/trainer.

Coach - Initial space provided after the examiner has comprehended and demonstrated the operation to your satisfaction.

Examiner Coach

Date:_____ _____ _____

Preparation of Court Exhibits

Examiner - Initial space provided after you have discussed / explained/ demonstrated your ability to your coach/trainer.

Coach - Initial space provided after the examiner has comprehended and demonstrated the operation to your satisfaction.

	Examiner	Coach
Date:_____	_____	_____

Court Procedures and Related Laws

Examiner - Initial space provided after you have discussed / explained/ demonstrated your ability to your coach/trainer.

Coach - Initial space provided after the examiner has comprehended and demonstrated the operation to your satisfaction.

	Examiner	Coach
Date:_____	_____	_____

Moot Court

Examiner - Initial space provided after you have discussed / explained/ demonstrated your ability to your coach/trainer.

Coach - Initial space provided after the examiner has comprehended and demonstrated the operation to your satisfaction.

	Examiner	Coach
Date:_____	_____	_____

Instruction on Training Classes

Examiner - Initial space provided after you have discussed / explained/ demonstrated your ability to your coach/trainer.

Coach - Initial space provided after the examiner has comprehended and demonstrated the operation to your satisfaction.

	Examiner	Coach
Date:_____	_____	_____

Field Cases/Crime Scene Processing

Examiner - Initial space provided after you have discussed / explained/ demonstrated your ability to your coach/trainer.

Coach - Initial space provided after the examiner has comprehended and demonstrated the operation to your satisfaction.

	Examiner	Coach
Vehicle Date_____	_____	_____
House or Building Date:_____	_____	_____

Processing Bodies for Latent Prints

Examiner - Initial space provided after you have discussed / explained/ demonstrated your ability to your coach/trainer.

Coach - Initial space provided after the examiner has comprehended/ demonstrated the operation to your satisfaction.

	Examiner	Coach
Date:_____	_____	_____

AFIS Terminal Orientation

Examiner - Initial space provided after you have discussed / explained/ demonstrated your ability to your coach/trainer.

Coach - Initial space provided after the examiner has comprehended and demonstrated the operation to your satisfaction.

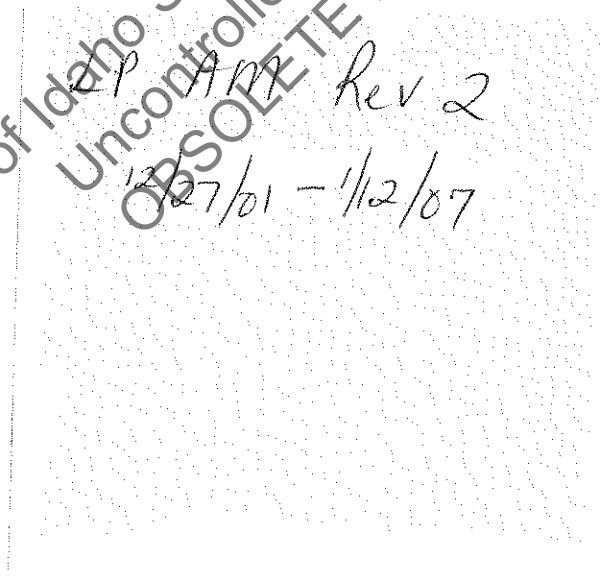
	Examiner	Coach
Date:_____	_____	_____

STANDARD OPERATING PROCEDURES

OF THE

IDAHO STATE POLICE FORENSIC SERVICES

LATENT FINGERPRINT SECTION



History Page

The original version of the Latent Fingerprint Section SOP Manual is dated August 30, 2000.

Revision 1, revised from revision 0 was effective July 13, 2001.

Revision 2, revised from revision 1 is effective

Approval _____ Date _____

Approval _____ Date _____

TABLE OF CONTENTS

GOALS OF THE LATENT FINGERPRINT SECTION:

1. To properly receive, record, and return physical evidence submitted to the laboratory.

2. To conduct examinations for latent prints on physical evidence, to maintain records, and to prepare a report on the results of the analysis.

3. To give expert court testimony.

4. To instruct or inform members of the criminal justice system on aspects of latent print processing and analysis.

1.0.0. REFERENCES

1.1.0. ISPFS Procedure Manual.

1.2.0. ISPFS Health and Safety Manual

1.3.0. American Society of Crime Laboratory Directors (ASCLD) Manual.

1.4.0. U.S. Army Criminal Investigation Laboratory Technical Manual.

1.5.0. Manual of Fingerprint Development Techniques (Home Office).

2.0.0. PURPOSE

This document defines standard procedures for processing the majority of evidence encountered by the Latent Section.

3.0.0. RESPONSIBILITIES

3.1.0. The Latent Section Supervisor is responsible for ensuring that personnel adhere to established standard operating procedures and safety practices.

3.2.0. Individual examiners are responsible for adherence to established operating procedures and safety guidelines.

3.3.0. The Latent Section Equipment Officer is responsible for ordering, maintaining, and inventory of all equipment used in the section.

3.4.0. The Latent Section Chemical Officer shall be responsible for ordering, receiving, labeling, logging and dating all chemicals used in the processing of latent print evidence and maintaining the Material Safety Data Sheets (MSDS) for all chemicals maintained in the section.

3.5.0. The Latent Section staff consists of 1) Supervisor, and 3) Latent Fingerprint Examiners.

3.6.0. Access to the Latent Section laboratory areas will be limited to staff and authorized visitors.

4.0.0. STANDARDS AND CONTROLS

4.1.0. Standards and controls required for a specific type of processing will be addressed in this manual as required. It should be noted, however, that exact measurements and proportions when preparing chemical solutions are desirable for consistent quality, but successful results in developing latent fingerprints are not dependent upon unequivocal accuracy. There is a considerable margin for error in preparing chemical solutions for latent fingerprint techniques without adversely affecting the successful development of latent prints.

4.2.0. Equipment necessary for latent print processing (Omniprint 1000, Gallenkamp humidity chamber, Coleman Vacu-Print, eye washes/shower, and chemical vent hoods) will be maintained in accordance with manufacturers specifications and records kept. Annual inspections will be conducted and records kept. The section supervisor will maintain these procedures and records.

4.3.0. All chemical reagents and solvents should be of an appropriate grade for their intended use.

4.4.0. Standard working solutions prepared in the laboratory will be properly labeled with identity, the date prepared, expiration date if applicable, and the initials of the person who prepared them. Each solution will be tested when prepared and this test documented in the reagent log along with the date made, carrier used, and initials of the individual making the solution. Concentrations, normality's, etc. should be expressed in correct numbers of significant figures. Stock solutions, which are retained for use over a period of time, should be labeled with a scheduled shelf life if applicable.

5.0.0 SAFETY

5.1.0. All Latent Section personnel are advised to utilize appropriate work practices when handling the chemicals and solvents used in latent print procedures.

5.2.0. Safe work practices include:

5.2.1. Wearing personal protective equipment such as gloves, laboratory coats, eye protection, etc., when handling any chemicals.

5.2.2. Making sure that all engineering controls such as ventilation hoods, etc., are used properly.

5.2.3. Utilizing clean work habits such as washing hands after the

preparation of chemical solutions (even though gloved), and no eating or drinking in the labs

5.3.0. Specific safety practices regarding personal protective equipment and work practice controls are outlined within each processing technique described in this manual.

5.4.0. Safety practices regarding engineering controls, biohazards, the disposal of chemicals, etc., are outlined in the ISPFS Health and Safety Manual.

5.5.0. Hazards and safety procedures associated with all chemicals used are contained in the MSDS file stored in the chemical laboratory. Employees have the responsibility to read the MSDS prior to handling unfamiliar materials or if they have any questions about how the chemicals is being used in the laboratory.

6.0.0. METHODS AND PROCEDURES USED IN PROCESSING EVIDENCE

6.1.0. Written technical procedures are available describing examination protocols for each category of evidence which is routinely examined.

6.2.0. These procedures will describe the methods, procedures, and techniques which are routinely used in the examination of evidence. The procedures cannot be expected to address each and every situation or type of evidence encountered. The individual examiner must exercise sound judgment in selecting the methods which will best suit the requirements of the evidence submitted for a specific case; therefore, the procedures will be designed to accommodate the majority of evidence encountered.

6.3.0. Visible ridge detail suitable for comparison should generally be photographed upon initial examination, as additional detail develops, after a specific technique, and/or prior to a subsequent technique.

6.4.0. As specific chemical solutions are used to enhance or develop latent prints, these solutions should be tested prior to use. All chemical solutions will be tested after they are mixed and before use and results will be noted.

6.5.0. The physical, chemical, or electronic techniques which are used to locate, develop or enhance prints are found in the section on protocols.

7.0.0. LATENT PRINT QUALITY GUIDELINES

7.1.0. Friction ridge examinations are based on the following premises:

7.1.1. The fundamentals of the science of friction ridge identification are permanence and individuality. The comparison and identification of two areas of friction ridge skin impressions are based on the examination of ridge structure, individual ridge appearance, pores, minutiae, and spatial relationships.

7.1.2. There is no scientific basis for requiring that a minimum number of corresponding friction ridge features be present in two impressions in order to effect an identification.

7.2.0. Fundamental Principles of Quality Assurance in Friction Ridge Analysis.

7.2.1. Latent print examiners must be successfully trained to competency before effecting an identification.

7.2.2. All identifications must be verified by a qualified latent print examiner.

7.3.0. Friction Ridge Analysis.

7.3.1. Definitions and Conclusions:

7.3.1.1. Print evaluation:

Prints are of value for comparison or they are not. "Of value" for comparison means that sufficient ridge detail is present to warrant a comparison in the opinion of the examiner.

7.3.1.2. Identification:

An identification is the determination that two corresponding areas of friction skin impressions originated from the same person.

7.3.1.3. Non-identification:

A Non-identification is the determination that two corresponding areas of friction ridge skin did not originate from the same person.

7.3.1.4 Incomplete or Unclear Known Impressions:

Incomplete or unclear known impressions may result in the inability to reach either an identification or non-identification decision.

7.3.1.5. Qualified Identifications:

Friction ridge identification are absolute conclusions. Probable, possible, or likely identification conclusions are outside of the acceptable limits of the science of friction ridge identification.

7.3.2. ASCLD/LAB Discrepancy:

7.3.2.1. Class I

7.3.2.1.1. Erroneous Identification:

An erroneous identification is the incorrect determination that two areas of friction ridge impressions originated from the same person. An erroneous identification is the most serious error an examiner can make in technical case work.

7.3.2.1.2. Erroneous Verifications:

Verification of an erroneous identification is equal to having effected the original erroneous identification.

7.3.2.2. Class II

7.3.2.2.1. Missing Identifications:

A missed identification is the failure to make an identification when in fact both friction ridge impressions are from the same origin. This is not an erroneous identification.

7.3.2.3. Class III

7.3.2.3.1. Clerical and Administrative Discrepancy:

Clerical and administrative errors are not erroneous identifications. Examples include, but are not limited to, writing the wrong finger number or name.

7.3.2.4. Conflict Resolution:

When conflict develops in making an identification, a principle examiner or IAI certified examiner will review the latent in question. If an identification is made, it should be verified by another IAI Certified examiner if possible, or the Latent Section Supervisor.

7.3.2.5. Corrective Action:

When erroneous latent print identifications occur, the primary consideration is the prevention of further discrepancies, personnel retention, and salvage of the latent print examiner's training investment following ISP Forensic Services guidelines when at all possible.

Also in accordance with practices of the Latent Print Certification Program of the International Association for Identification, and barring extenuating circumstances, the Latent Print Section Supervisor may recommend the Laboratory Manager consider the following actions in a Class I Discrepancy:

1. Revocation of latent print examiner's certification and one year retraining for one erroneous latent print identification.

2. Permanent revocation of latent print examiner's certification and a transfer to other duties or dismissal for more than one erroneous identification during a latent print examiner's entire career.

8.0.0. TRAINING AND QUALIFICATION RECORDS

8.1.0. Training Records:

The Latent Section will maintain training records on each examiner and they will be on file in the section.

8.2.0. Curriculum Vitae:

The Latent Section will maintain a copy of each examiners Curriculum Vitae on file in the Latent Section.

9.0.0. LATENT PRINT LIFTS AND PHOTOGRAPHS/IMAGES

9.1.0. Latent print lifts shall have the following:

9.1.1. Unique case identifier

9.1.2. Date and initials or date and personal marking

9.1.3. Impression source (description or source identifier)

9.2.0. Latent print lifts or case notes shall include the following:

9.2.1. Scene location or address

9.2.2. Significant information about the orientation and/or position of the latent print on the object through description and/or diagram(s).

9.3.0. Latent print photographs/images or case notes shall include the following:

9.3.1. Unique case identifier

9.3.2. Date and initials or date and personal marking

9.3.3. Impression source description or source identifier.

9.3.4. Scene location or address.

9.3.5. Significant information about the orientation and/or position of the latent prints on the object through description and/or diagram(s).

9.3.6. Scale information.

10.0.0. EVIDENCE HANDLING PROCEDURES

10.1.0. Evidence must be collected, received, and stored so as to preserve the identity, integrity, condition, and security of the item.

10.2.0. Chain of Custody:

A clear, well-documented chain of custody must be maintained from the time that the evidence is collected or received until it is released.

10.3.0. Each examiner will have an area of short-term storage that is equipped with a proper lock. Keys to these locks will be limited to the individual examiner and a record of their distribution will be kept by the Latent Section Supervisor.

10.4.0. Evidence Handling and Storage:

10.4.1. Evidence that has financial value (money, weapons, etc.) must be stored under lock and key when not being processed. In order to insure a correct count, money will be counted by the examiner and witnessed by one other person when first opened and again when it is resealed.

10.4.2. Evidence that contains a controlled substance will not be accepted in the Identification Section. Officers delivering evidence in person will be requested to separate out the substance prior to submission. If a controlled substance is received in the Identification Section via the U.S. Mail or UPS it will be returned to the agency without being processed. The submitting agency will be contacted, advised of this policy, and requested to resubmit the item only after the controlled substance has been removed.

10.4.3. Evidence will be handled according to ISPFS Procedure Manual, Chapter 3. Evidence Handling.

11.0.0. CASE WORK DOCUMENTATION AND REPORT WRITING

11.1.0. Case work documentation and report writing will be according to ISPFS Procedure Manual, Chapter 5. Handling Casework.

11.2.0. Documentation must be sufficient to ensure that any qualified latent print examiner could evaluate what was done and replicate any comparison.

11.3.0. Verification of all identifications must be documented.

11.4.0. Reports must contain the following:

11.4.1. Case identifier

11.4.2. Identity of the examiner

11.4.3. Date of report

11.4.4. Description of evidence

11.4.5. Results of latent print examination

11.5.0 Case file organization/management

11.5.1. Documentation should be placed in the folder as follows from front to back:
1) Evidence receipt
2) Case report
3) Lab worksheets, notes, photocopies, etc. (stapled together)
4) AFIS requests/reports (stapled together)
5) Reports/information from submitting agency (stapled together)

11.5.2. Latent prints lifted by Ident Section staff will be placed into an evidence envelope, logged in as evidence, and placed in the latent filing cabinet in the vault.

11.5.3. Photographs, negatives, and digital images produced by Latent Section staff will be placed into the 9"x 9" stamped envelopes, logged in as evidence, and placed in the latent filing cabinet in the vault.

12.0.0. PROFICIENCY TEST

12.1.0. Proficiency testing will be according to ISPFS Procedure Manual Chapter 8. Quality Control 8.1. and ASCLD/LAB 1.4.3.

13.0.0. CONTINUING EDUCATION

13.1.0. Examiner's skills must be maintained by activities such as:

13.1.1. Receiving specialized training

13.1.2. Attending educational seminars

13.1.3. Reading professional publications

13.1.4. Conducting and publishing research

13.1.5. Completing self-study programs

13.1.6. Instructing specialized classes or seminars

13.1.7. Continuing formal education.

14.0.0. TESTIMONY REVIEW

14.1.0. Testimony review will be according to ISPFS Procedure Manual Chapter 7. Subpoena and Testimony Policy, Evaluation of Testimony 7.2

15.0.0. QUICK REFERENCE PROCESSING GUIDE

GENERAL EVIDENCE:

NOTE: As each technique is completed, the evidence is visually examined for the presence of identifiable ridge detail. When identifiable ridge detail is visible, the evidence should be photographed prior to any additional processing. The exact steps and procedures are dependent on the examiner's experience and discretion.

POROUS:

1. Visual: White light and possible / Alternate Light Source (ALS)
2. Iodine Fuming (if used)
3. Visual: White light examination
4. DFO (if used)
5. Visual: ALS examination
6. Ninhydrin
7. Visual: White light
8. Physical Developer
9. Visual: White light

NOTE: See FORMULARY, Appendix A for additional instructions.

NON-POROUS:

1. Visual: White light
2. Cyanoacrylate Fuming
3. Visual: White light / ALS
4. Dye Stain
5. Visual: ALS / or Ultraviolet light (UV) as required
6. Powders: Luminescent or non-luminescent
7. Visual: White light / ALS

SPECIFIC EVIDENCE:

BLOOD EVIDENCE:

Non-porous:

1. Visual: White light
2. Cyanoacrylate Fuming
3. Visual: White light
4. Amido Black
5. Visual: White light / ALS
6. De-stain / Rinse solution
7. Visual: ALS

8. Powders: Luminescent or non-luminescent
9. Visual: White light / ALS

Porous:
1. Visual: White light / UV (fabric-background luminescence)
2. Amido Black or Ninhydrin
3. Visual: White light

CARDBOARD:

1. Visual: White light and possible / ALS
2. Ninhydrin (Iodine Fuming and DFO can be used prior to Ninhydrin)
3. Visual: White light and UV (background luminescence)
4. Physical Developer
5. Visual: White light

CARTRIDGE CASES:

1. Visual: White light
2. Cyanoacrylate Fuming
3. Visual: White light / ALS
4. Dye Stain
5. Visual: ALS

GLOSSY PAPER:

1. Visual: White light
2. Cyanoacrylate Fuming
3. Visual: White light / ALS
4. Powders: Luminescent or non-luminescent
5. Visual: White light / ALS
6. Ninhydrin
7. Visual: White light
8. Physical Developer
9. Visual: White light

HUMAN SKIN:

Macerated Fingers (water soaked)
1. Photography (when possible)
2. Take record prints, if skin flexibility permits.
3. Send to FBI if necessary

Mummified Fingers (dried)
1. Photography (when possible)

2. Take record prints, if skin flexibility permits.
3. Send to FBI if necessary

LEATHER:

1. Visual: White light
2. Visual: ALS
3. Cyanoacrylate Fuming: ALS
4. Powders: Luminescent or non-luminescent
5. Visual: White light / ALS

PAINTED SURFACES:

Latex Paint: process as for porous evidence
Semi-gloss/enamel paint: process as for non-porous evidence

PHOTOGRAPHS:

Emulsion side:
1. Visual: White light
2. Cyanoacrylate fuming
3. Visual: White light / ALS
4. Powders: luminescent or non-luminescent
5. Visual: White light / ALS

Paper (reverse side): Process as for porous evidence

PLASTIC BAGS:

1. Visual: White light
2. Cyanoacrylate fuming
3. Visual: White light / ALS
4. Dye Stain
5. Visual: White light / ALS
6. Powders: Luminescent or non-luminescent
7. Visual: White light / ALS

RUBBER GLOVES:

1. Visual: White light
2. Cyanoacrylate fuming
3. Visual: White light / ALS
4. Dye Stain
5. Visual: ALS
6. Powders: Luminescent or non-luminescent

7. Visual: White light / ALS

TAPE:

Adhesive side:

1. Visual: White light **OR**
2. Gentian Violet (crystal violet)
3. Visual: White light
4. Physical Developer
5. Visual: White light

1. Visual: White light
2. Cyanoacrylate Fuming
3. Visual: White light / ALS
4. Dye Stain
5. Visual: ALS

OR

1. Visual: White light
2. Sticky side powder
3. Visual: White light

Non-adhesive side:

1. Visual: White light
2. Cyanoacrylate Fuming
3. Visual: White light / ALS
4. Dye Stain
5. Visual: ALS
6. Powders: Luminescent or non-luminescent
7. Visual: White light / ALS

VARNISHED WOOD:

1. Visual: White light
2. Cyanoacrylate fuming
3. Visual: White light / ALS
4. Dye Stain (ex. Rhodamine 6G in water solution)
5. Visual: ALS
6. Powders: Luminescent or non-luminescent
7. Visual: White light / ALS

WET SURFACES:

1. Visual: White light **OR**
2. Small Particle Reagent
3. Visual: White light / ALS
4. Lift

1. Visual: White light
2. Dry to room temperature
3. Visual: White light/ ALS
4. Physical developer

16.0.0 METHODS (MLP)

MLP 16.1.0. PACKAGING OF PAPER ITEMS

REFERENCES:

ISPFS Procedure Manual. Chapter 3.

Scott's Fingerprint Mechanics, Robert D. Olsen, (1978). Page 134.

Fingerprint Techniques, Andre Moenssens (1971). Page 136.

The Science of Fingerprints, F.B.I., (1963). Page 174.

INTRODUCTION:

Proper packaging of paper items is necessary to assure the integrity of the evidence as well as to preserve possible latent print evidence. Proper packaging is required in the laboratory as well as at crime scenes.

PROCEDURE:

When paper items are received in the laboratory or recovered at a crime scene, the paper items are evaluated as to the examinations and handling that will be required. Precautions need to be taken so that additional contamination/deposition of prints does not occur. If additional examinations are needed the paper items are packaged in an appropriately-sized envelope or box and the container is sealed. The exterior of the container is then marked with the analyst's initials, the case number, item number and any other information deemed necessary. The materials are then placed in the evidence vault.

If there is a chance that a document examination will be done to look for indented writing on the evidence, it is important that the analyst not mark the outside of an envelope while the document is inside. The analyst may be adding indented writing to the document.

Wet items can be handled in the above manner after the evidence is air-dried, or can be submitted in the same water that the documents were found in. Paper items being submitted wet need to be kept in a water-tight container or kept frozen.

MLP 16.2.0. PACKAGING OF NON-POROUS ITEMS

REFERENCES:

ISPFS Procedure Manual. Chapter 3.

Scott's Fingerprint Mechanics, Robert D. Olsen, (1978). Pages 133-134.

Fingerprint Techniques, Andre Moenssens, (1971), Page 136.

The Science of Fingerprints, FBI, (1963). Page 174.

Manual of Fingerprint Development Techniques, Home Office Police Scientific Development Branch (1998).

INTRODUCTION:

Proper packaging of non-porous items is necessary to assure the integrity of the evidence as well as to preserve any possible latent print evidence. Proper packaging is required in the laboratory as well as at crime scenes.

PROCEDURE:

When non-porous items are received in the laboratory or recovered at a crime scene, the non-porous items are evaluated as to the examinations and handling that will be required. Precautions need to be taken so that additional contamination/deposition of prints does not occur. If additional examinations are needed, the non-porous items are packaged in sturdy containers (such as boxes or metal cans) in a manner in which the suspected latent print bearing surfaces do not contact any other surfaces. Fingerprints on smooth non-porous surfaces are easily damaged. If possible, items should be held by areas where fingerprint detection is least likely. The container is then sealed and the exterior is marked with the examiner's initials, the laboratory case number, item number, and any other information deemed necessary. The material is then turned in to the Technical Records Specialists to be placed in the evidence vault.

MLP 16.3.0. SUBMISSION OF HUMAN HANDS, FINGERS, AND FEET

REFERENCES:

ISPFS Health and Safety Manual

The Science of Fingerprints, FBI, (1997). Pages 134-162.

INTRODUCTION:

Normally, hands, fingers, or feet are only submitted to the Latent Section when normal printing procedures fail or cannot be applied due to the decomposed state of the hands, fingers, or feet.

Every attempt at obtaining deceased prints in the field should be exhausted prior to any consideration of having the hands or fingers severed and submitted to the Latent Section. It is our responsibility to assist law enforcement officers, when called upon to do so, to determine when the hands should or should not be severed and submitted.

When the printing has been done, the hands, fingers, or feet will be returned to the submitting agency.

PROCEDURE:

1. All body parts received at the lab should already be sealed and then placed in the refrigerator or freezer.

2. Any body part that involves a person infected with or possessing antibodies for the HTLV-III - LAV (AIDS Virus) will not be accepted for processing.

3. Submitting hands or fingers of deceased persons:
   - When possible, it is most desirable to have both of the hands, severed at the wrist, and forwarded in their entirety. This eliminates the possibility of getting the fingers mixed up or incorrectly labeled.

   - If it is not possible to send the hands for some reason, the fingers should be cut off and forwarded. The fingers should be severed at the palm. As soon as each finger is cut off, it should be placed in an individual container and immediately labeled as to which particular

finger it is.

- It is preferred by the Latent Section that hands be submitted in the same condition as found and as soon as possible. If the hands were immersed in water, transport in water. If found dried out and hard, place in an airtight container and send without using any preservative. If hands cannot be delivered to the Latent Section within 24 hours after being discovered, preserve them by refrigeration. **Do not use a formaldehyde solution** to preserve the hands. This causes the hands to become brittle and hard, making the task of obtaining identifiable prints very difficult.

- Hands, fingers, or feet should only be severed and removed by the attending medical examiner or under their authority and supervision.

ADDITIONAL INFORMATION:

Safety: Gloves, lab coat, and/or a protective disposable apron will be worn at all times when working with any body parts. All utensils used and any area that the body parts come in contact with will be washed down with the disinfectant foam cleaner.

MLP 16.4.0 RECORDING INKED IMPRESSIONS

REFERENCES:

Scott's Fingerprint Mechanics, Robert D. Olsen, (1978). Pages 70-75.

Fingerprint Techniques, Andre A. Moenssens, (1971). Pages 144-145.

Friction Ridge Skin, James F. Cowger, (1983). Pages 14-19.

The Science of Fingerprints, FBI (12-84). Pages 116-162.

MATERIALS:

- Printer's ink, ink rollers/palmprint roller
- Fingerprint cards/quality bond paper
- Adhesive materials (tape and Kinderprint)
- Clear latent print lift backing
- Hypodermic needles, tissue builder, casting materials (Mikrosil),
- Lab coats, gloves, face shields,
- Cleaning materials (spray soaps, paper towels, etc.).

INTRODUCTION:

Recording inked fingerprints/palmprints is necessary to secure known samples for comparison with visualized latents friction ridge skin impressions. Recording inked fingerprints/palmprints for comparison with latent prints is most commonly done by officers of the submitting agencies. However, there are times when the examiner may need to secure the known inked fingerprints/palmprints.

PROCEDURE:

The method, number, and types of fingerprints/palmprint impressions taken are to be determined by the examiner's experience and discretion.

ADDITIONAL INFORMATION:

Safety issues when securing inked impressions include, but are not limited to:

Personal Safety - when taking inked finger and palmprints, precautions need to be taken should the person become violent. This often requires the presence of an officer to provide security.

Biological Contamination - when taking the inked impressions of a subject or cadaver, care must be taken to minimize the chance of contact with diseased and/or putrefied materials. Lab coats, gloves, and face shields should be worn at the discretion of the examiner.

Notes and documentation:

The content of case notes is largely up to the examiner's discretion but should be in accordance with laboratory protocol. Photocopies should be made of all fingerprint/palm print cards related to a case. These copies should be retained in the ISP/FS case file. If an Ident has been made from a particular card, and the card is being returned to the agency, it is strongly recommended that the card be scanned into the More Hits system prior to being returned.

MLP 16.5.0. RECORDING MAJOR CASE INKED IMPRESSIONS

REFERENCES:

The FBI Advanced Latent Fingerprint School Manual. Pages 167-172.

Scott's Fingerprint Mechanics, Robert D. Olsen, (1978). Pages 70-72.

Friction Ridge Skin, James F. Cowger, (1983). Pages 22-25.

MATERIALS:

- Printer's ink, ink rollers/palmprint roller
- Fingerprint cards/quality bond paper
- Adhesive materials (tape and Kinderprint)
- Clear latent print lift backing
- Hypodermic needles, tissue builder, casting materials (Mikrosil),
- Lab coats, gloves, face shields,
- Cleaning materials (spray soaps, paper towels, etc.).

INTRODUCTION:

Recording major case impressions is often necessary to secure known samples for comparison with visualized latent friction ridge skin impressions. Major case impressions consist of rolled fingerprints, palmprints, finger-joint impression, and the tips and sides of the fingers/palms. Recording inked major case prints for comparison with latent prints is most often done by officers of the submitting agencies. Occasionally, the examiner is requested to record the impressions at or in relation to a crime scene investigation.

PROCEDURE:

The mechanics for the taking of inked major case prints can be found in the section on major case inked impressions in the FBI Advanced Latent Fingerprint Manual. The examiner's training and experience will determine the number and types of impressions to be secured.

ADDITIONAL INFORMATION:

Safety issues when securing inked impressions include, but are not limited to:

Personal Safety - when taking inked finger and palmprints, precautions need to be taken should the person become violent. This often requires the presence of an officer to provide security.

Biological Contamination - when taking the inked impressions of a subject or cadaver, care must be taken to minimize the chance of contact with diseased and/or putrefied materials. Lab coats, gloves, and face shields should be worn at the discretion of the examiner.

Notes and documentation:

The content of case notes is largely up to the examiner's discretion but should be in accordance with laboratory protocol. Photocopies should be made of all fingerprint/palm print cards related to a case. These copies should be retained in the ISP/FS case file. If an Ident has been made from a particular card, and the card is being returned to the agency, it is strongly recommended that the card be scanned into the More Hits system prior to being returned.

MLP 16.6.0. LIFTING LATENT PRINTS

REFERENCES:

Scott's Fingerprint Mechanics, Robert D. Olsen, (1978). Pages 369-387.

Fingerprint Techniques, Andre, A. Moenssens, (1971). Pages 109-112.

Friction Ridge Skin, James F. Cowger, (1983). Pages 85-88.

Manual of Fingerprint Development Techniques Home Office Police Scientific Development Branch (1998).

MATERIALS:

- Lifting materials-tape, hinge lifts, rubber lifts, Mikrosil, and gelatin lifts.
- Camera and accessories.

INTRODUCTION:

Lifting powder or flame-processed latent prints is an effective technique for the preservation of the latent print impressions. This technique works because the adhesive on the lifting medium is stickier than the surface on which the latent print deposit resides. Lifting should be done after any necessary photography.

PROCEDURE:

Lifting latent print deposits that have been developed with the flame technique or have been powder processed is often an effective technique for the preservation of the latent print image. It is a good idea to have a variety of lifting mediums as they vary in clarity, adhesion, and flexibility. Caution should be exercised in using general purpose tapes as they may cause migration of some latent print ridge detail or may have striations or other imperfections making it hard to do comparisons. Lifting latent prints is often used in conjunction with photography of the latent print image. The examiner's training and experience will determine the use and/or sequence of the lifting and photographic processes. Finally, it is important that the back of the latent lift cards be filled out to the best of the examiner's ability. One should be able to pin point the area and orientation of a latent print on the object.

ADDITIONAL INFORMATION:

Advantages to the lifting of latent prints are:

- Lifting latent prints is an inexpensive, easy, and quick method of preserving developed latent print images.
- Lifting latent prints is an effective method of preserving the latent print images at a crime scene.

Disadvantages to the lifting of latent prints are:

- Lifting latent print images may not always be the most effective method of preserving the latent print image.
- Lifting sometimes destroys the latent print image left on the surface and makes repeat lifting impossible.

MLP 16.7.0. BLACK AND WHITE FILM DEVELOPMENT GUIDELINES

Kodak T-MAX 100

Handle undeveloped film in total darkness. Do not use a safe light. Wind film onto reels and place in the developing tank. Make sure that the lid is securely fastened.

PROCESSING:

1) Fill tank with 68°-70° F. running water. Firmly tap the tank on the top of the work surface to dislodge any air bubbles. Allow film to sit in water for one (1) minute, then empty water down the drain.

2) Fill tank with pre-mixed Kodak D-76 Developer. Firmly tap the tank on the top of the work surface to dislodge any air bubbles. Provide initial agitation of 5 to 7 inversion cycles in 5 seconds, i.e., extend your arm and vigorously twist your wrist 180 degrees. Repeat this agitation procedure at 30-second intervals for the rest of the development time. Develop film for fifteen to twenty (15-20) minutes. Return used D-76 developer to jug using proper funnel.

3) Rinse film with 68°-70° F. running water for two (2) minutes, then drain.

4) Fill tank with pre-mixed Kodak Fixer. Firmly tap the tank on the top of the work surface to dislodge any air bubbles. Agitate film frequently during fixing. Fix film for fifteen to twenty (15-20) minutes. Return used fixer to jug using proper funnel.

5) Rinse film with 68°-70° F. running water for a minimum of two (2) minutes, (20-30 minutes if time allows) then drain. Film may be removed from tank at this point and examined.

6) Fill tank with Perma Wash, agitate and let stand for two (2) minutes. Pour Perma Wash Down the drain.

7) Rinse film with 68°-70° F. running water for two (2) minutes, then drain.

8) Fill tank with 68°-70° F. water, add two or three squirts of Photo Flo and agitate. Photo Flo minimizes water/drying marks.

9) Remove excess water from film with two fingers or with Chamois. Hang and dry film in a dust-free place.

NOTES- Pre-mixed chemicals should all be room temperature (68°-70° F.) when used.

Fixer will be exhausted more rapidly with KODAK T-MAX Professional Films than with other films. If negatives show a pink stain after fixing, the fixer may be near exhaustion or the fixing time was too short. If the stain is slight, it will not affect image stability, negative contrast, or printing times. However, if the stain is pronounced and irregular over the film surface, refix the film in fresh fixer.

MLP 16.8.0. LATENT FINGERPRINT/IMAGE SUBMISSIONS TO BCI/AFIS

LATENT EVIDENCE RECEIVED:

Latents lift cards accompanied by elimination or suspect prints:
All latent cards accompanied by elimination or suspect prints need to be examined for quality and compared to the submitted elimination and suspect prints prior to being sent to BCI. Any remaining quality latents not identified will then be forward to BCI/AFIS if warranted.

Latents prints received without elimination or suspect prints:
Any latent prints received without accompanying elimination or suspect prints, and not associated with other evidence awaiting latent processing should be submitted, with proper documentation, directly to BCI/AFIS.

Latents prints addressed to BCI/AFIS, but received by FS:
Latent prints addressed to BCI/AFIS, but received by FS should be submitted along with proper documentation directly to BCI/AFIS.

LATENT EVIDENCE GENERATED:

Latents developed by ISP/FS latent examiners that need to go to BCI/AFIS:
Each FS latent examiner, who develops latent lift cards will place them in a small evidence envelope with FS lab number in the proper place on the envelope (upper right corner). The examiner will start the chain of custody by signing the first entry at the bottom of the envelope. A BCI/AFIS form WILL be filled out by the case latent examiner, attached to the envelope and submitted to the TRS. The TRS will then attach a bar-code for IETS and scan it into IETS. The TRS will then forward the envelope with documentation (BCI/AFIS form) to BCI.

NOTE- File jackets should also be given to the TRS at this time. They will be placed in the filing cabinet at the front of the office and returned to the examiner when the evidence is returned from BCI. This will allow the chain of custody to be maintained on the Evidence Receipt.

Latents to be retained by ISP/FS:

The Latent Section filing cabinet in the evidence vault is bar-coded and latent lift cards developed by the Latent Section examiners will be retained in this cabinet. Latent lifts are to be logged into IETS and tracked like all other evidence.

NOTE-All latents lift cards will be handled as evidence, this means that proper chain of custody and security measures need to be followed.

DIGITAL IMAGES GENERATED (LATENT)

Latent image prints to be sent to BCI/AFIS:

Images need to be placed in a 9x9 inch fingerprint card envelope which has the lab number, examiner's name, and a note to return the latent images to the examiner. All digital image prints need to be the best possible quality, black and white, and 1:1 (the fact that the images are 1:1 should be noted somewhere on the image, or you may use a scale).

A BCI/AFIS form needs to be filled out by the examiner and attached to the envelope. The envelope, with form attached, will then be placed in a special outgoing bin. This bin is located next to the evidence vault door on the old Latent Section side where it will be picked up by the BCI/AFIS staff.

The returning BCI/AFIS results will be dropped off in an incoming BCI/AFIS bin next to the before mentioned outgoing bin. The images/results can then be picked up by the case examiner.

Upon conclusion of the case, the photographs/images envelope and contents and the BCI/AFIS form will be retained in the ISP/FS case file.

17.0.0. PROTOCOLS (PLP)

PLP 17.1.0. DETECTION OF LATENT PRINTS WITH POWDER

REFERENCES:

Scott's Fingerprint Mechanics, Robert D. Olsen, (1978), pages 209-235.

Fingerprint Techniques, Andre A. Moenssens, (1971), pages 106-109 and 112-114.

Friction Ridge Skin, James F. Cowger, (1983), pages 85-88.

Manual of Fingerprint Development Techniques Home Office Police Scientific Development Branch (1998).

MATERIALS:

- Powders-traditional, magnetic, and fluorescent powders
- Applicator- magnetic wand, feather brush, fiber glass, animal hair etc.
- Alternate light source

INTRODUCTION:

Latent friction ridge skin residue can be detected on smooth, non-porous objects by the application of commercial fingerprint powders. This coloring of the fingerprint residue occurs because the latent print residue has greater adhesion properties than the substrate. The powder particles adhere to the latent print residue allowing the latent print to be visualized. The use of cyanoacrylate esters often increase the adhesion of latent print residue.

PROCEDURE:

When making an examination for the presence of latent print impressions on smooth, non-porous surfaces, powder processing is often the method of choice. The type of powder that is selected is dependent upon:

- contrast to the surface bearing the latent print
- characteristics of the powder
- the nature of the surface to be processed

The type of applicator that is selected is dependent upon:

- the size of area to be dusted
- the type of powder to be used
- the type of surface to be dusted

Test impressions-when there is doubt as to the suitability of a powder for processing a particular surface a test impression should be made on a similar surface if available. If a similar surface is not available, then an area of the suspected surface may be explored "blindly" (i.e. wiped clean and used for testing).

ADDITIONAL INFORMATION:

Safety concerns when using commercial fingerprint powders are minimal. Examiners are required to use the exhaust vents positioned at each workstation when doing powdering and lifting in the lab. When fingerprint powders are to be used for an extended period of time, a dust mask or half face respirator with dust filters should be worn to minimize the inhalation of the fingerprint powder particles. Persons using fingerprint powders should monitor reactions (if any) to the fingerprint powders.

Advantages to using fingerprint powders are:

- Processing with fingerprint powders is fairly rapid and inexpensive.
- Powder processing is most often the method of choice in the laboratory or at crime scenes where a large quantity of materials are to be examined.

Disadvantages to using powders are:

- If fingerprint powders are used as the first technique, the process may prohibit other types of latent print examinations.
- Success using fingerprint powders is dependent on proper lighting and the examiner's experience and care in using the process.

PLP 17.2.0. POWDER PROCESSING OF ADHESIVES

REFERENCES:

Journal of Forensic Sciences, Vol. 44, No. 2, "Sticky-Side Powder: The Japanese Solution", Darren S. Burns, pages 133-138.

"Sticky-Side Powder", Technical Note, Lightning Powder Co., (April, 1994).

MATERIALS:

- Sticky-Side powder
- Photo-Flo
- Small glass beaker
- Stir rod
- Camel hair fingerprint brush or a small paint brush
- Glass tray
- Tap or distilled water

INTRODUCTION:

Processing the adhesives on the sticky sides of tape and other items, such as labels, present problems in processing. Traditional powders will not work (unless modified) because the adhesive properties of the tapes cause the powder to obscure the latent print deposits. Sticky-Side powder is a liquid fingerprint detection technique that produces gray-developed latent prints when applied to adhesive surfaces. Sticky-Side powder may be more appropriate for certain types of tapes than for others (ex. masking tape vs. electrical tape). Surfaces that require other forensic examinations, such as trace or serology, should be carefully evaluated prior to processing to determine if this procedure will have an impact on subsequent examinations.

PROCEDURE:

Adhesive surfaces that need to be examined for latent prints can be examined by using Gentian Violet or Sticky-Side powder at the examiner's discretion.
Sticky-Side powder detects the fatty/oily and/or epithelial cells often left when handling the adhesive surface on items such as tape or labels.

Sticky-Side powder can be used in two ways, the powder solution can be painted on, or the surface can be immersed in an aqueous solution containing the powder solution.

Sticky-Side powder solution is prepared as follows when using the paint on method:

1. Mix a solution of water and Photo-Flo in a glass beaker in a 1:1 ratio.

2. Mix a quantity of Sticky-Side powder (as needed) in a beaker with the water/Photo-Flo solution to make a liquid that has a consistency of paint.

The above solution is painted onto the adhesive surface with the brush and allowed to remain on the surface for 10 to 20 seconds after which the surface is rinsed with water. If left on the surface for too long, it may become difficult to rinse off. The adhesive surface is then evaluated for latent prints and dried thoroughly. Any suitable latent prints are photographed or covered with a protective cover such as lifting tape or clear plastic. The surface can be reprocessed to improve contrast and/or make the latent print(s) darker.

To use the submersion method, the glass tray is filled to an appropriate depth with water and the prepared solution of powder and Photo-Flo is added to the water. The examiner's experience determines the proper amount of the powder solution to be added. Some of the powder will suspend in the water and the water should be agitated or stirred to cause the maximum amount of the powder to remain suspended. After inserting the adhesive surface (adhesive side up) in the tray, the particles of powder will settle onto the surface being examined. The surface is removed from the water after twenty seconds (or longer, at the examiner's discretion) and rinsed with water if necessary. This procedure can be repeated if desired. Latent prints that are developed can be preserved as previously described.

It is not necessary to have commercially-prepared Sticky-Side powder to use this type of processing. An alternate method of using **a liquid fingerprint powder solution** is as follows:

1. Measure out .5g of fingerprint powder.

2. Add 1 ml of water to the fingerprint powder.

3. Add 1 ml of Liqui-Nox or other liquid detergent.

4. Thoroughly mix the liquid and fingerprint powder.

5. Apply the solution to the adhesive surface in the same manner as for using Sticky-Side powder.

ADDITIONAL INFORMATION:

Safety: when using the Sticky-Side powder in the previously described manner, there does not appear to be a significant health hazard. When using the powder in the dry form, precautions should be taken to prevent the powder from becoming airborne and possibly inhaled. Laboratory safety protocol should be followed when using the powder. Small amounts of Sticky-Side powder can be safely washed down the drain, while larger amounts should be collected in a suitable container for disposal.

Control tests are easily accomplished by placing one's own fingerprints on a piece of tape and following the processing guidelines. An examiner can not proceed with the processing of the evidence until a control test baring satisfactory results (positive) has been carried out and documented in the laboratory case notes and on the control tests work sheet.

Advantages of using the Sticky-Side powder are as follows:

- Sticky-Side powder is an inexpensive method of processing the adhesive surfaces of tapes and labels.
- Sticky-Side powder does not require the use of much equipment and can easily be used at crime scenes if necessary.
- The latent prints detected with the powder are stable and dark in color.

Disadvantages of using the Sticky-Side powder are as follows:

- The powder solution tends to be rather messy.
- A source of water is needed for rinsing the processed surfaces.

PLP 17.3.0. IODINE FUMING

REFERENCES:

Friction Ridge Skin, James F. Cowger, (1983), pages 93-96.

Fingerprint Techniques, Andre A. Moenssens, (1971), pages 114-120.

Scott's Fingerprint Mechanics, Robert D. Olsen, (1978), pages 247-256.

Manual of Fingerprint Development Techniques, British Home Office, (1998), Chapter 4.

Peavey Product Guide, (1999).

MATERIALS:

- Iodine crystals
- Fume hood
- Container such as a small chamber or a plastic bag
- Iodine fuming "gun," glass wool, calcium chloride
- Iodine fuming stix

INTRODUCTION:

Iodine fuming is one of the oldest latent print techniques currently employed in the examination processes for the visualization of latent prints. The iodine vapors are absorbed by the fatty portion of a latent print deposit and turn the latent print a brownish color. Iodine is toxic in any form, and as a result, is only used in such instances as when the desired latent is suspected to have more fatty deposits than normal. An example could be when the contaminant forming the latent print deposit is suspected to be something such as kitchen grease or butter.

PROCEDURE:

In a fume hood, break open a glass ampoule of iodine crystals to reveal the iodine crystals. Place the crystals in an airtight chamber (that has adequate venting available to evacuate the chamber after use) with the questioned surface and a similar control surface which bears a quality latent print. The iodine crystals will start to sublimate, go from a solid to a gas, resulting in purplish fumes with the

application of heat (approximately 100° F). If desired, an electric heater can be wired into the chamber that is being used for iodine fuming. The latent prints will start to turn a yellowish-brown color. The process needs to be carefully monitored so that over-development does not occur.

If the questioned surface is too large to fit in a chamber, the surface can be processed by using a commercially available fuming gun. The fuming "gun" consists of a length of rubber tubing (that acts as a mouthpiece) with a length of glass tubing (about 6") attached. The glass tubing contains glass wool and calcium chloride crystals to absorb the moisture that is introduced into the tube when the apparatus is blown into. Attached to the rubber-stoppered glass tube is a thistle tube into which the iodine crystals are inserted. The "gun" is used by inserting iodine crystals into the open end of the thistle tube and wrapping one's hand around the tube. The warmth from the hand is sufficient to cause the iodine to change from a solid to a gas. The formation of purple fumes is indicative of the change.

When sublimation is noticed, the open end of the tube is directed toward the suspected latent print bearing surface and the mouthpiece is blown into to direct the purple fumes onto the surface. This processing with a "gun" is to be done in a fume hood or in an area with generous ventilation (preferably outdoors).

Another technique using iodine is called the "cold" method. This technique uses a heavy plastic bag to contain the exhibit, the atmosphere, and the iodine crystals. The exhibit is placed into the plastic bag with a quantity of iodine crystals (the equivalent of a standard iodine ampoule). The open end of the bag is then folded two or three times to make a temporary seal to contain the soon-to-be iodine rich atmosphere. The iodine crystals are then moved to one location in the bag. That portion of the bag is cradled in the hand and the body heat causes the change from solid to gas. The exhibit is monitored by viewing through the bag to determine when the processing is complete.

For small items, the iodine fuming stix, or "Fumette," available from Sirchie Fingerprint Laboratories Inc., make it possible to process prints on wood, paper, or cardboard surfaces on either vertical or horizontal surfaces. The heat from your hands combined with the moisture of your breath causes a chemical reaction that works well.

ADDITIONAL INFORMATION:

The resulting yellowish-brown latent prints that are characteristic of iodine processing can vanish and must be preserved. The finger marks are evaluated to determine which are suitable for comparison. Those fingerprints deemed to be of value are photographed as soon as possible, and notes are taken. Iodine prints that have faded, or are completely gone, can sometimes be redeveloped by reprocessing. This is only possible if no other techniques have been used nor too long of a time span has elapsed. Other latent print techniques such as DFO or ninhydrin tend to dissolve the fats that the iodine reacts with. Therefore, if iodine fuming is to be used, it must be used prior to other latent print development processes.

Iodine reacts to fresh prints better than old ones because the fats tend to change and become less receptive to this process with time.

Safety is a major concern when using the iodine technique. **Iodine is toxic in any form. ALWAYS AVOID INHALING IODINE FUMES AND NEVER BREATHE IN WHEN USING THE FUMING "GUN" APPARATUS!!** Iodine fumes may irritate the skin and damage the respiratory tract. Headaches that can last for several days may result from exposure to iodine. Long-term effects to the thyroid gland may result from exposure. Adequate ventilation when using the technique is mandatory as the fumes are very corrosive to metals and may discolor other surfaces that they come in contact with. Iodine also degrades the quality of the fuming "gun" by hardening and cracking the rubber stoppers and the rubber hose mouthpiece. The "gun" should be inspected before each use.

Iodine routinely comes sealed in glass ampoules or in bulk in glass jars. The sealed ampoules must stay sealed until use for safety purposes. The jars need to have the lids kept screwed tightly and the container kept in a chemical supply room until needed. As some leakage of the iodine vapors can occur after the lid on a jar is loosened for the first time, the ampoules are the recommended containers.

Control tests: Testing the iodine crystals is done upon each use. This test involves the making of quality latent prints on a test surface similar to the one being examined. The test print is exposed to the fumes in the same manner as the questioned surface. An examiner can not proceed with the processing of the evidence until a control test baring satisfactory results (positive) has been carried out and documented in the laboratory case notes and on the control tests work sheet.

Advantages of the iodine technique are as follows:

- Iodine is a quick, simple and inexpensive technique.
- If iodine fuming is used, it must be used prior to other latent print processes.
- Iodine developed latent prints will fade and disappear on documents leaving the surface undamaged unless there are metal items such as staples present. These will show signs of corrosion.

Disadvantages of the iodine technique are as follows:

- Iodine is toxic in any form.
- Iodine can interfere with subsequent examinations for body fluids.
- Iodine is not suitable for application on dark colored surfaces.

PLP 17.4.0. NINHYDRIN PROCESSING

REFERENCES:

Scott's Fingerprint Mechanics, Robert D. Olsen, (1978), pages 285-288.

Fingerprint Techniques, Andre A. Moenssens, (1971), pages 122-126.

Friction Ridge Skin, James F. Cowger, (1983), pages 96-98.

MATERIALS:

- N-Hexane, acetic acid, 2-propanol, ninhydrin crystals
- Glass trays/beakers/graduated cylinders
- Brushes/tongs
- Balance/magnetic stirrer, stirring bar
- Lab coats/gloves
- Face shields
- Steam iron/lab oven

INTRODUCTION:

Ninhydrin is the latent print processing technique that is most commonly used on porous objects, such as paper. Ninhydrin reacts with the amino acids and proteins present in the latent print deposit to produce a purple color. Ninhydrin processing should be done after iodine and DFO (1,8-Diazafluoren-9-ONE) processing but before processing with silver nitrate or physical developer. Surfaces that need other forensic examinations such as questioned document examinations should be carefully evaluated prior to processing to determine if this procedure will have an impact on subsequent examinations.

PROCEDURE:

Ninhydrin stock solution is mixed by obtaining a one-liter beaker and placing it on the magnetic stirrer. 300 ml of 2-propanol is then added to the beaker, followed by 100 ml of acetic acid. The stirring bar is placed in the beaker and the stirrer is turned to a slow stir while 50g of ninhydrin crystals are added to the solution. It may take up to two hours for all of the ninhydrin to dissolve.

Ninhydrin working solution is mixed by adding 30ml of the ninhydrin stock solution to a one-liter beaker. The beaker is then filled to the 1-liter mark with N-Hexane, and clarified with 2-propanol if needed. The working solution can be doubled or quadrupled if need.

Application the exhibits to be processed with ninhydrin are saturated with the ninhydrin solution in a fume hood or other well-ventilated area. The saturation of the item can be done by dipping in the solution, brushing the solution on the item, or by spraying the surface with the solution. Spraying is the least desirable of the application options as this allows the solution to become airborne.

NOTE: Upon standing in its storage container, some of the ninhydrin will "fall out of solution" causing a visible yellow layer at the bottom. Do not dip, brush, or spray items with this yellow layer.

After the exhibit is dry, the item is exposed to an atmosphere that is warm and humid. This can be accomplished in a lab oven or by passing a steam iron over the surface without touching the item. The combination of heat and humidity accelerates the reaction of the amino acids and ninhydrin to form the characteristic purple deposits (Rhuemann's Purple) which allow visualization of latent prints with the naked eye.

Any suitable latent prints are photographed because the latent prints will fade with time and may not be retrievable with reprocessing. It may be possible to increase the contrast between the ninhydrin developed latent and the substrate by using a yellow filter on the camera.

Latent prints that were made with blood can often be successfully darkened with an application of the ninhydrin solution. The ninhydrin reagent will cause the protein portion of the stain to turn purple and be darker and often will visualize parts of the latent print not readily seen with the naked eye. Prints in blood need to be fixed in some manner prior to processing with ninhydrin. Heat or methanol can be used as a fixative. Methanol is often the preferred method as it can be pipetted over the surface and limited to the stain so that the remainder of the surface is unaffected. Also, when using methanol the size of the object does not make as much of a difference as when using heat. Three or four applications of methanol are needed to fix the stain. When using heat as a fixative, the object is put in an oven for one hour at 100° centigrade. This heat fixing often ruins latent prints that are composed of normal latent print constituents. Failure to fix the stain does not always render a poorer quality latent print.
The ninhydrin solution is applied to the stain and allowed to remain at room temperature for approximately 48 hours. The ninhydrin will turn the protein

component of the blood/serum stain a dark purple. This may often be the stain of choice on bloodstains because of the apparent increased sensitivity of the reagent over other techniques such as Amido Black. This may be used on porous items as well as non-porous surfaces. Non-porous surfaces should be processed with cyanoacrylate esters prior to the application of the ninhydrin reagent. This allows for further processing of the item with other conventional techniques.

ADDITIONAL INFORMATION:

Safety is a concern when using or mixing ninhydrin solution. Gloves and a lab coat should be worn when using or mixing ninhydrin. A face shield should be worn if there is a chance of the solution splashing into the face or eyes. The examiner needs to be aware of the fact that the skin will stain if it is allowed to come in contact with the ninhydrin solution. Precautions should also be taken to avoid inhalation of the fumes.

The solvent used in the ninhydrin working solution, Hexane, is *extremely flammable* and the solution is to be used or mixed in a fume hood or in another well-ventilated area.

Glacial Acetic Acid is *corrosive* and extremely irritating to the eyes and respiratory system. Avoid breathing the vapors and use in a fume hood or with adequate ventilation. Glacial Acetic Acid will cause burns if it comes in contact with skin.

2-Propenol, also known as Isopropyl Alcohol, is *flammable*. It is an irritant, and can be harmful if inhaled. Avoid breathing the vapors and use in a fume hood or with adequate ventilation.

Small amounts of excess reagent can be evaporated off in the fume hood while larger quantities should be collected for disposal.

Control tests are easily accomplished by placing one's own fingerprints on a piece of paper and following the processing guidelines. An examiner can not proceed with the processing of the evidence until a control test baring satisfactory results (positive) has been carried out and documented in the laboratory case notes and on the control tests work sheet.

Advantages of the ninhydrin solution are:

- Ninhydrin is simple to use, inexpensive, and very effective.

- Ninhydrin will detect latent prints that are months or years old.

Disadvantages of the ninhydrin solution are:

- Ninhydrin will not detect latent prints deposited by all donors.
- Ninhydrin will not detect latent prints on items that have gotten wet.

PLP 17.5.0. DFO PROCESSING

REFERENCES:

Manual of Fingerprint Development Techniques, British Home Office, Chapter 4, (1998).

Technical Notes #1-0038, Lightning Powder Co., 1,8-Diazafluoren-9-One (DFO)

MATERIALS:

- DFO, methanol, ethyl acetate, acetic acid, petroleum ether
- Balance/magnetic stirrer, stirring bar
- Alternate light source
- Lab coats/gloves
- Face shields
- Lab oven
- Glass ware/graduated cylinder

INTRODUCTION:

DFO (1,8 Diazfluoren-9-ONE) is an analogue of the ninhydrin molecule that luminesces when illuminated with monochromatic light in the 485 nm to 510 nm range. The use of the DFO reagent when processing porous surfaces provides greater sensitivity than previously offered by the ninhydrin reagent. DFO does not replace the ninhydrin reagent but is used before and in addition to the ninhydrin reagent. Surfaces that need other forensic examinations such as trace or questioned document examinations should be carefully evaluated prior to processing to determine if this procedure will have an impact on subsequent examinations.

PROCEDURE:

DFO stock solution: measure and mix solvents in a fume hood. While a magnetic stirrer is not necessary, it does make the mixing process go faster. Dissolve 0.5 gram of DFO powder in 100 ml of methanol. When the powder is dissolved, add 100 ml of ethyl acetate. When it is thoroughly mixed, add 20 ml of acetic acid. Store this solution in a dark brown glass or polypropylene bottle.

DFO working solution: measure and mix these solvents in a fume hood. Do not mix this solution until you are ready to use it. For best results, the manufacturer

recommends not using any working solution which is older than two to three weeks. If one liter (1000 ml) of working solution is needed, take the entire 220 ml of stock solution and add 780 ml of petroleum ether, mixing thoroughly. If less working solution is desired, halve or quarter the solutions accordingly.

Application: the paper specimen should be dipped into the solution for ten seconds and allowed to dry for about three minutes (DFO may also be swabbed on). This step should be repeated, as two dippings and dryings seem to be better than one application. Although it is possible to spray this solution, it is **not recommended** due to the health hazards involved and its inability to soak the specimen adequately.

Heat is then applied in an oven. While expensive chemical ovens can be used, a regular household toaster oven will work. The specimen should be heated for ten minutes at 100° C (212° F). View the paper item under a forensic light source or laser.

As an alternative to an oven, a hair dryer or dry iron will work. If using one of these alternative heat sources, place a thick towel or other protective material on the counter first, followed by the evidence. Then, place a few paper towels on top of that. Apply dry heat to the surface for several minutes. A dry iron can be placed directly on top of the paper towels and used the same as when ironing clothes. It is possible to stop ironing to check the progress with a forensic light and, if the latent prints are not very bright, continue to iron for a few minutes longer. Sometimes, this added heating time will improve resulting print development. The DFO-developed latent prints may or may not be visible to the naked eye, but should be viewed under a forensic light source or laser. Any suitable latent prints on the item are photographed using the ALS and a filter on the camera (orange or red). Faint latent prints may be made to luminesce brighter with a second or third application of DFO. The second and third applications of DFO (if necessary) are done in the same manner as the first.

DFO is not intended to replace ninhydrin, but should be used in conjunction with ninhydrin. DFO will detect latent prints on porous surfaces that ninhydrin will not and the reverse is also true.

ADDITIONAL INFORMATION:

Safety in the laboratory is always a concern and standard laboratory protocol is followed when handling solvents. DFO has not been fully tested for potential health hazards but is thought to be similar to the ninhydrin molecule, which may act as an irritant. Gloves, lab coats, and face shields (if there is a chance of the DFO becoming airborne) should be worn when mixing and using DFO. The application of the DFO working solution should be done in a fume hood or in a well-ventilated area, or while wearing an air-purifying respirator equipped with an organic vapor cartridge.

Glacial Acetic Acid is *corrosive* and extremely irritating to the eyes and respiratory system. Avoid breathing the vapors and use in a fume hood or with adequate ventilation. Glacial Acetic Acid will cause burns if it comes in contact with skin.

Methanol needs to be handled carefully and non-permeable gloves worn during mixing and use. Methanol is toxic in quantities as small as 30 ml and should not be allowed to come in contact with the skin, eyes, or mouth. It is possible for methanol to be absorbed through the skin. If methanol comes into contact with the eyes or mouth, the area should be flushed with generous amounts of water and a doctor consulted. Inhalation of methanol vapors should be kept at a minimum and the DFO should be used in a well-ventilated area.

Control tests are easily accomplished by placing one's own fingerprints on a piece of paper or cardboard similar to the evidence, and following the processing guidelines. An examiner can not proceed with the processing of the evidence until a control test baring satisfactory results (positive) has been carried out and documented in the laboratory case notes and on the control tests work sheet.

Advantages of DFO are:

- It is relatively simple to use, and very effective.
- DFO will detect latent prints that are months or years old.

Disadvantages of the DFO are:

- You must use an alternate light source to visualize and photograph any developed prints.
- DFO may cause diffusion or running of some inks.
- Fingerprints may develop if items are handled after treatment.

PLP 17.6.0. USING PHYSICAL DEVELOPER

REFERENCES:

Manual of Fingerprint Development Techniques, British Home Office, (1999), Chapter 4.

Advances in Fingerprint Technology, Henry C. Lee, R.E. Gaensslen, (1994), pages 79, 80, 81, 95, 112.

Technical Note #1-2730, Lightning Powder Co., (1993).

MATERIALS:

- Physical Developer Kit (parts A & B)
- 2 glass trays/graduated cylinders
- Plastic tongs

INTRODUCTION:

Physical developer is a technique for processing porous items to allow the detection of latent fingerprints. Physical developer reacts with lipids, fats, oils, and waxes present in the fingerprint residue to form a silver-gray deposit. This technique is the final step in the sequential processing of porous items. The physical developer technique replaces the silver nitrate technique most of the time. Physical developer is the only technique to show adequate results on paper items that have gotten wet, and has shown good results on paper currency. Physical developer can also be used to detect shoe prints on paper items. The ability to detect shoe prints on paper is limited by the composition and contamination of the sole. Surfaces that need other forensic examinations such as body fluid, trace, or questioned document examinations should be carefully evaluated prior to processing to determine if this procedure will have an impact on subsequent examinations.

PROCEDURE:

The processing of porous items with physical developer uses two solutions: Solution A (20% silver nitrate) and Solution B (reductant solution).

Application: the step-by-step procedure for using physical developer is as follows:

1) The actual processing should be done in the stainless steel sink in the chemical lab. The physical developer solution will cause dark stains on any surface with which it comes in contact with.

2) Wash and rinse glass trays. Any contaminants on the glass trays will ruin the physical developer. To avoid any cross contamination, always use clean glassware rinsed with tap water, then with distilled water.

3) Arrange the glass trays in the sink so that the paper items can be moved easily from tray to tray in the proper sequence.

4) Add 5 ml of solution A (20% silver nitrate solution) to 90 ml of solution B (reductant solution) in a beaker. Stir the working solution for approximately one minute with a clean glass/plastic stirring rod. Do not mix the working solution until you are ready to use it as it does not have a very long shelf life.

5) Add the physical developer working solution to its dedicated glass tray.

6) Wash and rinse the beaker that is used to mix the physical developer solution.

7) Use plastic photographic tongs or plastic forceps without serrated edges to remove articles from PD solutions. Do not use metal tools.

8) Conduct a control test.

9) Place the item to be processed into the physical developer using the tongs. Immerse the item and gently rock the tray for approximately 5 to 15 minutes (examiner's discretion). The item is then removed and placed into another clean tray with running tap water until the excess stains are gone. The water should run clear from the tray.

10) The processed item needs to completely dry prior to final examination and any developed latents need to be photographed.

ADDITIONAL INFORMATION:

Cleanliness is important in the physical developer technique. A good deal of the instability in the earlier solutions was a result of laboratory equipment that was not spotless. Some contaminants, especially salts, will cause the silver nitrate in the solution to come out of suspension thus spoiling the physical developer

solution and perhaps ruining the item being examined, therefore, it is important to keep the glassware spotless and rinsed with distilled or deionized water prior to use. When washing glassware, use detergent, not abrasive cleaners.

Physical developer will cause dark stains on many surfaces. Therefore, care must be taken to avoid spills in the laboratory. Full strength chlorine bleach will usually remove any stains from counter tops and floors, but the bleach may cause damage to fabrics stained with physical developer.

Safety: the standard protection of gloves, laboratory coats, and face shields (if there is a chance of the solution splashing into the face or eyes), is sufficient. Physical developer should only be used in well-ventilated areas, as it is irritating to the respiratory tract. Standard laboratory protocol is followed for chemical handling. Excess physical developer should be collected in a container for proper disposal.

Control tests are easily accomplished by placing one's own fingerprints on a piece of paper or cardboard similar to the evidence, and following the processing guidelines. When making test prints, keep in mind that physical developer reacts to the fats, and oils present in fingerprint residue. An examiner can not proceed with evidence processing until a control test baring satisfactory results (positive) has been carried out and documented in the laboratory case notes and on the control tests work sheet.

Advantages of Physical Developer are:

- Physical developer will find latent prints on dry paper that ninhydrin and DFO will not detect.
- Physical developer will detect latent prints on papers that have gotten wet.

Disadvantages of Physical Developer are:

- Instructions for making and use must be carefully followed.
- The use of the physical developer technique requires some experience to achieve the best results.
- It is more time and labor intensive than the other techniques for processing porous items.

PLP 17.7.0. CYANOACRYLATE PROCESSING

REFERENCES:

"Methods of Latent Print Development", Henry C. Lee and R. E. Gaensslen, 1987 Proceedings of the International Symposium on Latent Prints, pages 15-23.

Advances in Fingerprint Technology, Henry C. Lee and R. E. Gaensslen, (1991).

Journal of Forensic Identification, Vol.46, No. 4 July/August, 1996; Vol. 46, No. 1 January/February, 1996.

Coleman Vacu-Print Instructions and Notes, Lightning Powder, (1995).

Manual of Fingerprint Development Techniques, British Home Office, Chapter 4, (1998).

MATERIALS:

- Airtight container such as a tank or sealed plastic bag
- Cyanoacrylate such as "Hard Evidence" or super-glue
- Cups/warm water (optional)
- Low temperature heating element (optional)
- Sodium hydroxide treated cotton balls (optional)
- Coleman Vacu-Print apparatus

INTRODUCTION:

Fuming with cyanoacrylate esters (CAE/super-glue) is a process that is used to visualize latent print deposits on non-porous objects. It also serves to fuse the latent print to the surface, making it more stable and less easily damaged. The cyanoacrylate goes through a process known as polymerization where a white deposit is lain down upon the latent print residue. The process is temperature, humidity, and pressure sensitive. CAE processing prepares the surface for the acceptance of powders and dye-stains that may enable further visualization of the latent prints. Objects that need additional forensic examinations such as trace or questioned document examinations should be carefully evaluated prior to processing to determine if this procedure will have an impact on subsequent examinations.

PROCEDURE:

A smooth, non-porous surface that is to be processed with CAE needs to be exposed to an atmosphere rich in CAE fumes. This procedure requires the use of an airtight container (to trap the fumes to enable them to adhere to the surface) and a source of CAE fumes. The container can take many forms such as tanks or plastic bags, but it needs to have a transparent surface or have a readily assessable interior in order to check the progress of the procedure. The surface to be examined is placed in the container and then the CAE source is added.

One of the most common sources of CAE is a commercial preparation known as "Hard Evidence," which is available from Lightning Powder Inc. This is a sealed foil package containing a small amount of CAE in a gel form. The package is designed to be opened and used without additional preparation. Once the gel is exposed to the air, the CAE in the gel begins to vaporize at a controlled rate. The "Hard Evidence" packets may be stored at room temperature and have a shelf life of six months to a year.

Another CAE processing method is the use of CAE fumes in a vacuum chamber. The "Coleman Vacu-Print Instructions and Notes" list a step-by-step procedure for the processing of evidence in the vacuum chamber. Vacuum processing may be the preferred method when processing a large quantity of plastic bags because there does not have to be large spaces separating the bags and/or the bags do not have to be unfolded.

Other techniques that use heat or a sodium hydroxide treated pad to accelerate the vaporization of the super-glue are described in the previously mentioned references.

ADDITIONAL INFORMATION:

Safety: when used in the above-described manner, CAE are not believed to pose a health hazard. Super glue fuming should only be conducted in well-ventilated areas. Precautions should be taken to avoid inhaling or allowing the vapors to contact the eyes, as the vapors can be irritating to the eyes, nose, and mouth. Persons wearing contact lenses should not open CAE chambers without taking proper precautions. Non-vented goggles should be worn. Other precautions include using sealed CAE chambers and evacuating the air from the chambers prior to removal of the questioned and test surfaces.

Gloves should be worn to prevent the cyanoacrylate from contacting the skin. If liquid glue is allowed to contact the skin, adhesion may result. If the skin sticks

together, immerse affected areas in warm water. This will loosen the skin so that it can be gently pulled apart.

Control tests: testing of the CAE packets is done by observing the results of the CAE on a test sample that is included in the chamber. Placing one's own fingerprints on a black latent lift card works well for this purpose. Processing and quality control are done at the same time. A quality test print is applied to a surface and put into the tank with the questioned surface in an easily-monitored position. When the development of the test print is complete, the questioned surface is also finished.

Advantages of using the CAE process are as follows:

- CAE is a simple, quick, and inexpensive technique.
- Use of CAE prepares the surfaces for the application of powders, stains, and alternate light sources.
- The exposure of surfaces to CAE fumes hardens and plasticizes the latent print residue and makes the latent prints more durable.

Disadvantages to using the CAE process are as follows:

- The liquid glue option tends to be messy.
- The polymerized CAE coats the interior surfaces of the chambers with a whitish layer that can be difficult to remove.
- CAE are not effective on porous surfaces.
- CAE may affect further examinations such as firearms (if used heavily) and the serological examinations of body fluids and tissues.

PLP 17.8.0. RHODAMINE 6G PROCESSING

REFERENCES:

An Introduction to Lasers, Forensic Lights and Fluorescent Fingerprint Detection Techniques, E. Roland Menzel, (1991), pages 42-44.

Manual of Fingerprint Development Techniques, British Home Office, (1998), chapter 4

Chemical Formulas and Processing Guide for Developing Latent Prints, U.S. Department of Justice, F.B.I. Laboratory Division, (1994), pages 55-56.

Technical Notes #1-0041, Lightning Powder Co. Inc., pages 1-4.

MATERIALS:

- Rhodamine 6G powder
- Methanol or distilled water
- Balance
- Spatula, one-liter beaker, glass tray
- Spray or rinse bottles
- Alternate light source
- Photographic equipment

INTRODUCTION:

Rhodamine 6G is a dye-stain used primarily to aid in the luminescence of latent prints that have been treated with cyanoacrylate esters (CAE). It is used in the examination of smooth or semi-smooth non-porous items. Rhodamine 6G is a very important stain because it has light absorption properties that lend themselves to being used with Argon lasers, Copper Vapor lasers, and alternate light sources. Surfaces that need other forensic examinations such as body fluid or trace examinations should be carefully evaluated prior to processing to determine if this procedure will have an impact on subsequent examinations.

PROCEDURE:

Rhodamine 6G working solution: a spray or rinse bottle (approximately one liter) is filled with methanol or distilled water. Approximately 0.1 gram Rhodamine 6G (about the size of a BB) is added to the methanol or distilled water and the bottle is sealed. The bottle is then gently agitated to mix the Rhodamine with the water or methanol. The resulting solution is a light pink color. This working solution is irrigated over the item being processed and then rinsed off with methanol or water contained in another bottle. The Rhodamine 6G bottle should be labeled with the date and the contents (whether the solvent is distilled water or methanol). The solution can be stored at room temperature with an indefinite shelf life.

ADDITIONAL INFORMATION:

The amount and strength of the dye-stain used is left to the examiner's discretion. Rhodamine 6G luminesces when exposed to light in the 450 - 525 nm range, and viewed through an orange filter. Slight color variations may be noted. These variations may be due to the mixing of the stain or the substrate. The variations do not affect the quality of the examination.

The use of distilled water in lieu of methanol is useful when methanol may damage the item being processed, as may be the case with some lacquers, plastics, or tapes.

It is recommended that Rhodamine 6G be used prior to powdering, not after.

Control tests: the working solution of Rhodamine 6G will fluoresce when illuminated with an alternate light source or a laser. Control tests should be documented in the laboratory case notes and on the control tests work sheet.

Safety: Rhodamine 6G is thought to be a relatively safe compound when exposures are at low levels. Rhodamine 6G should never be inhaled or allowed to get into the eyes or mouth, as it is an irritant. If this should occur, the eyes or mouth should be flushed with a generous amount of water and a doctor consulted.

Methanol is highly *flammable*. It needs to be handled carefully and non-permeable gloves worn during mixing and use of the stain. Methanol is toxic in quantities as small as 30 ml and should not be allowed to come in contact with the skin, eyes, or mouth. It is possible for methanol to be absorbed through the skin. If methanol comes into contact with the eyes or mouth, the area should be flushed with generous amounts of water and a doctor consulted. Inhalation of methanol

vapors should be kept at a minimum and the stain should be used in a well-ventilated area.

Rhodamine 6G dye-stain can be disposed of in the following manner:

- Methanol-based stains can be allowed to evaporate in a fume hood.
- Water-based stains can be disposed of in a waste bottle with an absorbent material to soak up the liquid (see ISPFS Health and Safety Manual).

Advantages of Rhodamine 6G are:

- The Rhodamine 6G process may develop older latents more effectively thus rendering more useful latents.
- It can be utilized on a large range of textures and surfaces.

Disadvantages of Rhodamine 6G are:

- Rhodamine 6G must be viewed in a darkened environment utilizing an alternate light source.
- The carrier (methanol or water) may damage some surfaces.
- It is more time and labor intensive than the other techniques for processing non-porous items.

PLP 17.9.0. AMIDO BLACK BLOOD PRINT PROCESSING

REFERENCES:

Manual of Fingerprint Development Techniques, British Home Office, (1998).

Journal of Forensic Identification, Vol. 45, No. 5 Sept/Oct 1995, "Superglue of Latent Shoe Prints in Blood Prior to Processing", pages 498-50.

Proceedings of the International Forensic Symposium on Latent Prints, "Enhance Latent Prints in Blood With New Staining Techniques", Paul Norkus and Kevin Noppinger, page 147.

MATERIALS:

- Amido Black
- Glacial acetic acid, methanol
- Distilled water
- Balance, magnetic stirrer/stirring bar
- Pipettes
- 2 liter beaker, graduated cylinder
- Appropriately sized storage bottles, squirt bottles

INTRODUCTION:

Processing surfaces that have been contaminated with blood and other body fluids posses problems in the detection of friction ridge skin impressions because these prints consist of different constituents than normal latent print deposits which consist of sweat, fats, and oils. Prints in blood, on non-porous surfaces, can be processed with Amido Black to detect faint deposits of friction ridge skin impressions. Amido Black is a dye that stains the protein portion of blood (or other body fluids) a blue-black or bright blue color. The reagent will not detect the normal constituents of latent fingerprints and therefore must be used in the proper sequence with other latent processing techniques when blood-contaminated latent prints are examined. Amido Black is also known as Amido Black 10B, Amido Black 12B, Napthol Blue Black, or Napthalene Black.

PROCEDURE:

Smooth, non-porous surfaces, suspected of bearing blood-contaminated friction ridge impressions, require special consideration. Any samples to be used for the serological examination of blood deposits or trace analysis need to be collected before the examination and enhancement of the surface for blood-contaminated latents.

Blood-contaminated friction ridge impressions need to be fixed before the processing for latent prints can begin. This is because the liquid solutions used in the Amido Black process may wash away some or all of the blood deposits. Fixing can be done using heat, methanol, or super-glue. Blood can be fixed to an object by heating in a 100° centigrade oven for thirty minutes (restricted to non-heat sensitive objects). When using methanol, it may be sprayed or pipetted over the item. Super-glue is the most effective as it will fix all possible latent prints not just those contaminated with blood.

The Amido Black process utilizes a working solution, a rinse solution, and another wash solution (distilled water). The solutions needed for Amido Black processing have an indefinite shelf life. Storage of the solutions should be in glass bottles that are labeled appropriately. A step-by-step procedure for mixing the solutions is provided below.

Amido Black working solution:

1. Weigh out 3-5 grams of Amido Black and place it in a clean, dry one-liter beaker.
2. Measure out 100 ml of acetic acid and add it to the Amido Black.
3. Measure out 900 ml of methanol and add it to the beaker containing the Amido Black and acetic acid. Stir the solution with a magnetic stirrer for thirty minutes and transfer the solution to a clean storage bottle.

Amido Black rinse solution (de-stain):

4. Measure out 100 ml of acetic acid and pour it into a clean, dry, two-liter glass beaker.
5. Measure the 900 ml of methanol and add it to the beaker. Stir the solution for two to three minutes and transfer the solution to a clean, dry storage bottle.

Water rinse:

6. Rinse with water after the rinse solution.

Application: use of the Amido Black reagent requires the item to be immersed in the working solution for two to three minutes. Alternatively, the item may be sprayed or irrigated with the Amido Black working solution. The resulting latent prints are a dark blue-black.

Immerse or irrigate the item with the De-Stain Rinse Solution to remove the excess dye. Then immerse or irrigate the surface with the Water Rinse Solution. Allow the item to dry at room temperature and photograph any latent prints suitable for comparison.

ADDITIONAL INFORMATION:

Safety in the laboratory is a concern and proper laboratory protocol is followed when using any acids or methanol. Gloves, lab coats, respirators, and face shields or goggles (if there is a chance of the reagents becoming airborne) are worn when mixing or using Amido Black.

Glacial acetic acid is corrosive and extremely irritating to the eyes and respiratory system. Avoid breathing the vapors and use in a fume hood or with adequate ventilation. Glacial Acetic Acid will cause burns if it comes in contact with skin.

Methanol is *flammable*. It needs to be handled carefully and non-permeable gloves worn during the mixing and use of Amido Black. Methanol is toxic in quantities as small as 30 ml and should not be allowed to come in contact with the skin, eyes, or mouth. It is possible for methanol to be absorbed through the skin. If methanol comes into contact with the eyes or mouth, the area should be flushed with generous amounts of water and a doctor consulted. Inhalation of methanol vapors should be kept at a minimum and the solution should be used in a well-ventilated area.

In addition, examiners must be aware of the biological hazards associated with blood and other body fluids and take extra precautions to protect themselves.

Excess reagent should be collected in a container for proper disposal.

Control tests:

After mixing, the reagents should be tested by application of the reagent to a slide prepared with blood or a blood portion. For safety reasons, examiners *will not* prepare test prints made with blood. An examiner can not proceed with the processing of the evidence until a control test baring satisfactory results (positive) has been carried out and documented in the laboratory case notes and on the control tests work sheet. After testing, the reagents can be stored until needed.

Advantages of Amido Black are:

- Amido Black is a simple inexpensive process.
- Amido Black may be the best process for detecting faint, blood-contaminated friction ridge skin impressions on non-porous surfaces.

Disadvantages of Amido Black are:

- Amido black will interfere with forensic examinations for body fluids, fibers, hairs, paint, and most other examinations.
- Amido black will only stain traces of blood, and will not detect the friction ridge skin impressions composed of normal latent print constituents.
- Methanol may damage some surfaces.

PLP 17.10.0. GENTIAN VIOLET PROCESSING

REFERENCES:

Chemical Formulas and Processing Guide for Developing Latent Prints, FBI, (1994).

Lightning Powder Technical Notes, "Crystal Violet," (2000).

Processing Guide for Developing Latent Prints, "Gentian Violet," USDJ/FBI, (2000).

MATERIALS:

- Gentian Violet or Crystal Violet Powder
- Balance
- Graduated cylinder, Glass tray, Storage bottles
- Magnetic stirrer/stirring bar (or other stirring device)

INTRODUCTION:

Gentian Violet (or Crystal Violet) is a biological stain that is used in the laboratory to visualize latent print deposits on the adhesive side of many tapes. It reacts with sebaceous sweat and epithelial cells that are transferred to the adhesive surface upon contact. Gentian Violet can also be used to develop prints on non-porous surfaces contaminated with grease and oils.

PROCEDURE:

Gentian Violet Working Solution: weigh out one gram of powdered Gentian Violet. Measure 1000 ml of distilled water and pour into glass tray. Add the Gentian Violet slowly. Combine the ingredients and stir using the stirring device for approximately twenty-five minutes. After the stain is completely mixed in the water, the solution is ready for use. Gentian Violet is usually made for the examination process as needed, tested, and discarded after use.

Application: items may be dipped in the solution or painted on with a small brush for approximately 1 to 2 minutes. Rinse by running cold tap water over the tape. Latent prints should appear purple in color. Black tape can be processed in the same manner. The resulting latents can then be transferred to resin-coated photo paper and photographically reversed.

ADDITIONAL INFORMATION:

Safety: Gentian Violet/Crystal Violet is a suspected human carcinogen. It is known to effect the kidney, ureter, bladder, and thyroid of animals. It can be harmful if inhaled, and is irritating to the eyes and skin. Therefore, Gentian Violet should not be used in large amounts. A respirator should be used when working with the dry form, and Gentian Violet should be prepared and used in a fume hood or well-ventilated area. The examiner should wear a lab coat, heavy duty (non-disposable) gloves, and a face shield if there is a chance of the liquid splashing into the eyes.

Control tests: are easily accomplished by placing one's own fingerprints on the adhesive side of a piece of transparent tape and following the processing guidelines. An examiner can not proceed with the processing of the evidence until a control test baring satisfactory results (positive) has been carried out and documented in the laboratory case notes and on the control tests work sheet.

Advantages of Gentian Violet are:

- It is effective, simple, and inexpensive.
- Gentian Violet may develop prints on adhesive surfaces that were previously invisible.

Disadvantages of Gentian Violet are:

- Gentian Violet should not be used on water-soluble adhesives.
- Gentian Violet should not be used in large amounts.
- Extra safety precautions need to be taken.

PLP 17.11.0. SMALL PARTICLE REAGENT PROCESSING

REFERENCES:

Manual of Fingerprint Development Techniques, British Home Office, (1998), chapter 4.

Advances in Fingerprint Technology, Henry C. Lee and R.E. Gaensslen, (1991), pages 82-83.

Technical Notes #1-2757, Lightning Powder Co.

MATERIALS:

- Molybdenum Disulfide
- Distilled water, Photo Flo 200
- Processing tray, Spray bottle
- 1500 ml beaker
- Balance
- Magnetic stirrer/stirring bar

INTRODUCTION:

Small particle reagent (SPR) consists of a suspension of fine molybdenum disulfide (MoS_2) particles in a detergent solution. This solution works like a liquid fingerprint powder by adhering to the fatty portion of the latent print residue resulting in a gray colored latent. Small particle reagent works best on surfaces that have been, or are wet. Surfaces that need other forensic examinations such as serology, questioned document, or trace examinations should be carefully evaluated prior to processing to determine if the SPR procedure will have an impact on subsequent examinations.

PROCEDURE:

SPR may be used in two ways; dipping or spraying. Dipping is the preferred method as spraying is less sensitive. Spraying should only be considered when no other method is feasible.

Small Particle Reagent Working Solution:

1. Place a 1500 ml beaker on magnetic stirrer base.
2. Add 1000 ml of distilled water to the beaker.
3. Place an appropriately sized stirring bar in the beaker.
4. Dissolve 30g of MoS2 in the water. (MoS2 comes in 30g bottles.)
5. Add three to four drops of Photo Flo 200 to the solution.

The SPR is put into a storage bottle, labeled, and stored until needed. The shelf life is two to three months.

Application using the SPR dipping procedure:

1. Stir the SPR thoroughly and pour the solution into a tray.
2. Agitate the solution in the tray and add the item to be processed to the solution.
3. After two or three minutes, remove the item from the SPR and gently rinse with tap water. Allow the surface to dry and inspect for any suitable latent prints. Any latent prints developed should be photographed and lifted.

Application using the SPR spray processing procedure:

1. Put the SPR into a spray bottle and shake thoroughly. The bottle should be shaken often to keep the MoS2 in suspension.
2. Spray the SPR onto the item being examined. If the location of the latent prints is known, spray the area above the prints and allow the SPR to flow over the prints.
3. Gently rinse the processed area with tap water and allow it to dry.
4. Inspect the area that was processed, photograph and lift any usable latent prints.

ADDITIONAL INFORMATION:

Safety: There does not appear to be any health hazards associated with MoS2, but the process should be monitored to see if there are any allergies. Lab coats, gloves, and face shields (if there is a chance of the solution becoming airborne) should be worn.

Control tests: An examiner can not proceed with the processing of the evidence until a control test baring satisfactory results (positive) has been carried out and documented in the laboratory case notes and on the control tests work sheet.

Advantages to the SPR treatment are:

- SPR is inexpensive, non-toxic, and easy to use.
- SPR can be used to process items that have gotten wet and can be used in the rain.

Disadvantages to the SPR treatment are:

- SPR is very messy and hard to clean up.
- It is difficult to prevent damage to latent prints located on the bottom side of an item being tray processed.

PLP 17.12.0 SUDAN BLACK PROCESSING

REFERENCES:

Manual of Fingerprint Development Techniques, British Home Office, Chapter 4, (1998).

Lightning Powder Technical Note No. 1-0034, "Sudan Black", (May, 1995).

MATERIALS:

- Sudan Black B powder, methanol, distilled water
- Beaker, glass tray, 100 ml graduated cylinder
- Balance
- Spatula, stirring rod
- Glass bottle

INTRODUCTION:

Sudan Black B is a dye which stains fatty components of sebaceous sweat to produce a blue-black image. It is less sensitive than some other processes for latent fingerprint detection but is of particular use on waxy surfaces. Examples of some other surfaces include those contaminated with grease, foodstuff, or dried deposits of soft drink. Sudan Black will also enhance super-glue developed fingerprints. Sudan Black B is NOT suitable for use on porous surfaces. Surfaces that need other forensic examinations such as serology or trace should be carefully evaluated prior to processing to determine if this procedure will have an impact on subsequent examinations.

PROCEDURE:

Sudan Black B Working Solution: place 15g of Sudan Black powder into a 2-liter glass beaker. Add 1-liter of methanol and stir with a plastic stirring rod. Add 500 ml of distilled water to the beaker and stir with the stirring rod. A black working solution will result. Some of the Sudan Black will not dissolve, but will remain as particulate matter floating in the solution or may appear as sediment. Pour the solution, including any solid matter, into a clean glass bottle with a tight-fitting screw top. Label the container appropriately. The working solution has an indefinite shelf life.

Application: shake the container of Sudan Black working solution and pour a sufficient amount into a tray that is large enough to hold the item of evidence. Soak the item for 2-3 minutes. Rinse the article in cool, running tap water. For large items, pour the solution over the surface, catching the run off in a tray for reuse. Rinse with cool running tap water.

Allow the item to dry at room temperature. Applying heat is not recommended. Evaluate the latent prints only after they have dried completely. Reprocessing can sometimes enhance faintly developed latent prints.

Latent prints developed with Sudan Black should be photographed. While it is possible to lift the prints with tape, the tape frequently does not lift the print sufficiently. Therefore, it is strongly recommended to photograph the latent prints before attempting to lift them.

ADDITIONAL INFORMATION:

Safety: there are no known health hazards associated with Sudan Black B provided that the examiner wears a lab coat, non-porous gloves, and eye protection (if there is any risk of the solution splashing). The Sudan Black working solution contains methanol. Methanol is toxic in quantities as small as 30 ml and should not be allowed to come in contact with the skin, eyes, or mouth. It is possible for methanol to be absorbed through the skin. If methanol comes into contact with the eyes or mouth, the area should be flushed with generous amounts of water and a doctor consulted. Inhalation of methanol vapors should be kept at a minimum and the Sudan Black should be used in a well-ventilated area.

Control tests are easily accomplished by placing one's own oil contaminated fingerprints on a non-porous object and following the processing guidelines. An examiner can not proceed with the processing of the evidence until a control test baring satisfactory results (positive) has been carried out and documented in the laboratory case notes and on the control tests work sheet.

Advantages of Sudan Black:

- Sudan Black is inexpensive and non-toxic.
- Sudan Black is useful on contaminated surfaces.

Disadvantages of Sudan Black:

- Sudan Black is relatively insensitive to uncontaminated prints.
- It is ineffective on dark or printed plastic items.
- Sudan Black can interfere with most other forensic examinations (including but not limited to handwriting, ink, paper and indented impressions, body fluids, fibers, hairs, and paint).

PLP 17.13.0. FLAME TECHNIQUE

REFERENCES:

Friction Ridge Skin, James F. Cowger, (1983), page 102.

Scott's Fingerprint Mechanics, Robert D. Olsen, (1971), pages 260-263

Fingerprint Techniques, Andre A. Moenssens, (1971), pages 126-127

MATERIALS:

- Camphor blocks/masking tape
- Shallow metal or Pyrex container
- Matches
- Fingerprint brushes

INTRODUCTION:

Some hard, smooth surfaces, especially galvanized metal, present problems for the latent examiner in the detection of latent print deposits. The latent prints dry out and resist the adhesion of cyanoacrylate esters and/or powders. The use of a dense smoke, such as that produced by the combustion of camphor, provides heat which softens the latent print deposit and the particulate in the smoke bonds with the deposit and colors the ridge detail so that the latent print can be visualized. Surfaces that need other forensic examinations such as serology or trace examinations should be carefully evaluated prior to processing to determine if the flame technique will have an impact on subsequent examinations.

PROCEDURE:

Preparation for the use of the flame technique is quite simple.

1) A block of camphor is placed in the metal or glass container. One edge of the block is ignited with a match or cigarette lighter. The combustion of the camphor produces a dense black smoke.

2) The surface to be examined with the flame technique is passed through the column of smoke until the surface is coated with a thin layer of soot particles.

The examiner needs to ensure that the surface does not get too hot as this may cause damage to the item being examined. Care must also be taken to make sure that the layer of soot does not become too heavy as the ridge detail may be destroyed or obscured.

3) After the surface is coated with a layer of soot, the surface is brushed with a fiberglass fingerprint brush and any suitable latent prints are photographed and/or lifted at the discretion of the examiner.

ADDITIONAL INFORMATION:

Safety is a concern because of the open flame required for use. Established laboratory practices concerning the use of open flames should be observed. This technique should be done in a fume hood or in a well-ventilated area to avoid contamination of the air with smoke and accidentally setting off the fire alarm.

Advantages of using the flame technique are:

- It is a simple, inexpensive, and easy process.
- Latent prints can be detected on some surfaces such as copper and galvanized metal where standard techniques may not work as well.
- The flame technique may be used after cyanoacrylate and standard fingerprint powders have been used.

Disadvantages of using the flame technique are:

- It is a dirty process due to the dense oily smoke produced by the combustion of the camphor.
- Surfaces processed with this technique can be damaged if too much heat is applied to the surface.
- Any technique that requires the use of an open flame has associated risks that must be considered.

PLP 17.14.0. TAPE-GLO

REFERENCES:

Lightning Powder Technical Notes, "Tape-Glo," (2000).

Material Safety Data Sheet, "Tape-Glo," (1999).

MATERIALS:

- Tape-Glo
- Water
- Pyrex tray
- Alternate light source
- Photographic equipment

INTRODUCTION:

Tape-Glo is an orange colored fluorescent dye used for the development of latent friction ridge impressions on the adhesive side of tapes and other adhesives. Tape-Glo is especially useful for the processing of dark colored tapes such as black electrical tapes. In the past, the adhesive side of electrical tape was processed by utilizing Gentian Violet and then attempting to transfer the latent print onto a piece of resin coated photo-paper. Tape-Glo provides a more direct and less labor intensive way to visualize these prints. Surfaces that require other forensic examinations, such as trace or serology, should be carefully evaluated prior to processing to determine if this procedure will have an impact on subsequent examinations.

PROCEDURE:

Adhesive surfaces can be dipped in the Tape-Glo or they can be sprayed with it as it is non-toxic. Dipping allows for better saturation. Select a tray large enough to contain the object to be processed. Place the tape in the tray adhesive side up, and pour enough Tape-Glo to cover the tape in the tray. The adhesive surface should be completely covered with a thin film. Allow the Tape-Glo to remain on the adhesive surface for at least 10-15 seconds. Remove tape from the tray and rinse thoroughly with water. Distilled water is suggested, but not required. Examine the adhesive surface with the alternate light source set to approximately 450 nm under an orange filter. Any useable latents can then be photographed. It is not

necessary for the tape to be dried before photographing. The orange colored filter should also be used to photograph the latent prints. It is possible to process paper or cloth backed adhesives by brushing the Tape-Glo on to the adhesive surface. The paper or cloth backed tape should be soaked in water for 30 seconds prior to the application of the Tape-Glo. Care must be taken to avoid getting the Tape-Glo on the porous surface as it could cause background fluorescence when viewed. Tape-Glo should be stored out of direct sunlight and at room temperature.

ADDITIONAL INFORMATION:

Safety: while Tape-Glo does not contain any flammable materials, it may be an irritant, so standard precautions should be taken to avoid contact with eyes and skin. This can be accomplished by wearing a lab coat, gloves, and a face shield or goggles (if there is a chance of it splashing in the face). It is not necessary for Tape-Glo to be used in a fume hood, and it is safe to use at scenes of crime.

Control tests: are easily accomplished by placing one's own fingerprints on the adhesive side of a piece of tape and following the processing guidelines. An examiner can not proceed with the processing of the evidence until a control test baring satisfactory results (positive) has been carried out and documented in the laboratory case notes and on the control tests work sheet.

Advantages of Tape-Glo:

- Tape-Glo is safe and easy to use.
- It is pre-mixed.
- Tape-Glo is good for developing prints on dark colored tape.

Disadvantages of Tape Glo:

- Tape-Glo must be visualized and photographed in a darkened area utilizing an alternate light source or laser.

18.0.0. FORMS (FLP)

FLP 18.1.0.

CHEMICAL:

PREPARATION INFORMATION:

SHELF LIFE:

REFERENCE:

QC METHOD:

DATE RECEIVED	MSDS	DATE OPENED	EXPIRATION DATE

REAGENT:

PREPARATION INFORMATION:

SHELF LIFE:

REFERENCE:

QC METHOD:

DATE	NAME OF PREPARER	MANUFACTURER/LOT #OF INGREDIENTS	COMMENTS/ RESULTS OF QC

FLP 18.3.0. ISPFS

LATENT FINGERPRINT SECTION

TRAINING MANUAL REVISION FORM

Date:_____

Proposed by:_____

Add Amend Repeal

Section:_____ Page:_____

Summary:

Proposed Language:

Forward form to Latent Fingerprint Section Supervisor.

FLP 18.4.0.

ISPFS

LATENT FINGERPRINT SECTION

SOP REVISION FORM

Date:_____

Proposed by:_____

Add Amend Repeal

Page:_____

Section:_____

Summary:

Proposed Language:

Forward form to Latent Fingerprint Section Supervisor.

FLP 18.5.0.

19.0.0. EQUIPMENT (ELP)

ELP 19.1.0. REVIEW OF THE IDAHO AUTOMATED FINGERPRINT IDENTIFICATION SYSTEM

REFERENCES:

Advances in Fingerprint Technology, Henry C. Lee and R. E. Gaensslen, (1991), pages 164-191.

Technical Policies and Procedures Manual, Western Identification Network, Inc.

INTRODUCTION:

The Idaho Automated Fingerprint Identification System (AFIS) is housed in the Bureau of Criminal Identification (BCI) and is a member of the Western Identification Network, Inc.(WIN).

All latent fingerprints submitted to AFIS are processed by the BCI staff. Any latents that do not receive a "HIT" against the fingerprint database remain in AFIS. AFIS will continue to search these latents until a "HIT" is made, or the statue of limitations runs out.

When a "HIT" is received, the case file, latent print, and fingerprint card are submitted to a latent fingerprint examiner for comparison. When an identification is made by the examiner, it must be verified by another examiner, after which an identification report is generated, and the submitting agency notified.

ELP 19.2.0. MORE HITS FORENSIC DIGITAL IMAGE PROCESSING SYSTEM

REFERENCES:

More Hits User Manual-Forensic Image Tracking System, (Version 2.0)

INTRODUCTION:

The More Hits Digital System is a computerized program that enables the examiners to use the information contained in an image more effectively. Digital images can be further visualized or enhanced utilizing a number of tools. The system is extremely versatile in that images can come from the digital cameras, a flat bed scanner, or from filmstrips.

PROCEDURE:

The More Hits Digital System allows the operator to adjust the contrast, brightness, black levels, lateral orientation, background noise, and tonal perspective of a captured image. The amount and kind of image processing used on an image is up to the examiner's discretion.

See the More Hits Digital System SOP.

ELP 19.3.0. OPERATION OF THE METLER TOLEDO BALANCE

REFERENCES:

Operating Instructions-Mettler Toledo BD Balances

INTRODUCTION:

This balance is designed for basic weighing operations. It provides a weighing range from 0-200g, with a readability of 0.01g. The Mettler Toledo Balance has an AC adapter, but may also be run using 8 AA batteries.

PROCEDURE:

To weigh an item- turn the balance on by pressing the ON button briefly. The scale is now in weighing mode. Press the O/T button to zero the balance. Place the item on the scale and record the weight.

To weigh out a certain amount of a material- turn the balance on by pressing the ON button briefly. The scale is now in weighing mode. Place the weigh boat or other container on the balance and press the O/T button to tare the container. Begin adding the material, the net weight of the contents is displayed. When the weigh boat or other container is removed from the balance, the weight of the container (tare) is displayed as a negative value.

To turn the balance off –press and hold the OFF button until "Off" is displayed.

ADDITIONAL INFORMATION:

For directions on calibration, switching weighing units, counting, and plus/minus and percent weighing see the Operating Instructions Manual. See also Section 4.1.0.

Maintenance: quality control checks will be made every 90 days, or more frequently if needed. The 0.10g, 1.00g, and 100.00g standards will be used and the results noted in the Equipment Maintenance Log.

ELP 19.4.0. OPERATION OF THE OHAUS TRIPLE BEAM BALANCE

INTRODUCTION:

The OHAUS triple beam balance is mainly used as a back up to the Metler Toledo digital balance. It is stored in the chemical lab. The routine operation of the OHAUS triple beam balance is given below.

PROCEDURE:

1. Set the balance up on a flat, level, even surface such as one of the work benches.
2. Slide the weights on the beams to the left until the "windows" on the sliding weights read zero in the center and are in the notches that can be felt when moving the weights.
3. The weigh boat or other container is placed on the pan and the large knob (on the left of the beam) is rotated right or left until the beam indicator centers on zero. This reading means the beam has been balanced on zero and will not include the weight of the boat or other container in the weight measurement.
4. When weighing, the material is placed in the weigh boat and the weights are slid to the right until the indicator balances. The combination of weights is read and the weight is recorded.
5. If a certain amount of a substance is to be weighed out, the beams are adjusted to read the desired weight (the weight above the tare weight) and the substance is added to the weigh boat until the beam balances.

ADDITIONAL INFORMATION:

Maintenance: since this balance is used only as a backup, quality control checks will only be preformed when it is going to be used.

ELP 19.5.0.OPERATION OF THE SANYO/GALLENKAMP FINGERPRINT DEVELOPMENT CABINET

REFERENCES:

Sanyo/Gallenkamp Instruction Manual for the FDC185 Fingerprint Development Cabinet, (1994).

SCOPE:

The Sanyo/Gallenkamp Fingerprint Development Cabinet is a controlled atmosphere unit for the heating of items in a heat and/or humidified environment. The ability to control the heat and humidity is especially useful when making examinations of latent print evidence that has been treated with ninhydrin or DFO (1,8 Diazafluoren-9-ONE).

OPERATION:

The Gallenkamp Fingerprint Development Cabinet can be operated in the ninhydrin sequence or DFO sequence. Determination of the required heat and humidity control is dependent upon the examination desired. Details of the operation of the cabinet can be obtained in the operation section of the Gallenkamp Instruction Manual. The most commonly used sequence is the one for ninhydrin. The dry bulb temperature should be set to 80.0° C. and the wet bulb temperature should be set at 70.0° C. A step-by-step usage guide can be found on pg. 14 of the instruction manual.

ADDITIONAL INFORMATION:

Additional information regarding maintenance, service, additional programming, and program profiles can be obtained by consulting the Gallenkamp Operator's Manual.

ELP 19.6.0. OMNIPRINT 1000(A)

REFERENCES:

Advances In Fingerprint Technology, Henry Lee and R. E. Gaensslen, pages 90, 115-118.

An Introduction to Lasers, Forensic Lights, and Fluorescent Fingerprint Detection Techniques, E. Roland Menzel, (1991).

Friction Ridge Skin, James F. Cowger, (1983), pages 106-107.

Omnichrome Evidence Detection with Forensic Laser Technology, (1989).

Omniprint 1000A Operating Instructions, Omnichrome.

INTRODUCTION:

The Omniprint 1000(A), Alternate Light Source, is a monochromatic light source that has a range of 450-570 nm with one port of white light. The Omniprint is used for the visualization of latent prints that have a natural, inherent luminescence, or prints that have been processed with a fluorescing dye-stain or powder. The light can also be used to detect the presence of certain body fluids such as semen and saliva. The monochromatic light can be used in the examination of documents involving inks and obliterated or indented writings.

PROCEDURE:

The OP1000 and OP1000A are easy to operate. However, the following setup must be followed in order to maximize the lifetime of the lamp and to ensure the safety of the user. Anyone who will be operating this system should become familiar with these instructions. If any questions arise, feel free to contact Omnichrome's forensic staff.

Setup: unpack the unit from the box. Fully unwind electrical cord from the bottom supports. Open the lid and check to see that both switches are in the "off" position. Plug the unit into a three-prong, grounded outlet. If an extension cord is used, it must be a heavy-duty grounded cord. Retain the box and packaging material in case the unit must be shipped.

Attach the fiber optic cable or liquid light guide. These cables are located in the black pouch under the lid. Remove the protective plastic cap from the end of the cable. Carefully insert the end of the cable into the opening on the unit.

The operator may unscrew the lens from the cable and attach the lens directly to the unit, allowing hands-free operation. The lid can be removed from the unit by sliding it off to the right.

When using the fiber optic cable, do not use the white light selection at full power for more than thirty seconds, as this will damage the cable.

The unit is now ready to be started. The following steps must be taken to properly operate the unit.

1. Turn the power rocker switch on. The switch will light, and the fan will begin to operate. Make sure the fan comes to full operating speed. You should be able to hear the fan come to this speed in a few seconds.

2. You may now turn on the lamp switch. The lamp should turn on in a few seconds. A ticking sound prior to the lamp engaging is normal.

3. To select wavelengths, turn the knob marked "Wavelength Selector Knob". A green light will appear next to the selected wavelength.

4. By observing evidence under the various wavelengths, and using the different colored goggles (yellow, orange, or red), proper wavelength and filter can be selected.

Safety: there are three types of hazards associated with the use of the Omniprint these are electrical, chemical, and light related.

As with other electrical appliances, guard against electrical shock. This can be accomplished by insuring that all connections are proper and that no loose, damaged, or frayed wires exist. Make sure the Omniprint is unplugged before attempting any maintenance and do not use outdoors if wet conditions exist.

Always use proper lab safety guidelines when using powders, dyes, and other chemicals. To properly protect themselves, examiners should know which personal protective equipment is appropriate as well as the hazards associated with each chemical being used with the alternate light source.

While the Omniprint is not a laser, the safety precautions are the same because high intensity light sources do pose health hazards. The eyes are generally more vulnerable than the skin, and appropriate eye protection must be used to protect them. Permanent eye damage can occur from reflected, refracted, or direct illumination to the eye. This is important because most of the light emitted by the Omniprint is not absorbed, but is reflected and scattered off the surface being examined. Extreme care should be taken around highly reflective surfaces. Never look directly into the light or allow beams to bounce off the surface into your eyes or the eyes of another person in the vicinity. The nature and extent of all potential hazards are not yet known because in-depth assessments have not been made on most of the high intensity light sources used in forensic identification work.

Shutdown: the OP1000 is a high intensity light source. It is best to allow the unit to run for longer periods of time. Omnichrome recommends a minimum operating time of fifteen minutes, instead of turning the unit off and on for short periods of time. Repeatedly turning the unit off and on will shorten the life of the lamp, which is rated for 70 hours of use. The lamp should be left on for at least three minutes at a time. Law enforcement agencies report that the lamp may last longer if the unit is operated according to these instructions. To turn off the unit, the following steps should be taken.

1. Push the lamp rocker switch to off. You must now wait for the unit to cool down.
2. After feeling the body of the unit and the exhaust, and determining that the unit is cool, the power rocker switch may be turned off.
3. Remove the fiber optic cable or liquid light guide, and replace the protective plastic cap on the end of the cable.
4. Loosely wind the cable and replace in black pouch. Place pouch in lid.
5. Unplug the unit and rewind electrical cord around the base of the unit.
6. Replace and latch lid onto unit.

Lamp Replacement: replacing burned-out lamps in the system is relatively simple, however; care should be taken to follow the below listed directions. Improperly replaced lamps could cause shorts within the unit. This type of damage can be costly to repair. Before attempting to change lamps, make sure the unit is turned off, unplugged, and that the following steps have been read and understood.

1. Verify that the unit is off and unplugged.

2. Unscrew knobs on control panel. These knobs are tightened to finger-tight pressure only and should not be difficult to remove. Pliers should not be used to tighten or loosen any knobs.

3. Pull out control panel to reveal the inner portion of the unit.

4. Disconnect lamp plugs from sockets.

5. Unscrew lamp from retainer. Again, these screws should be finger-tight and easily removed.

6. Pull out the old lamp from retainer.

7. Place the new lamp in the retainer by matching and centering the glass alignment bump on the lamp to the alignment notch on the retainer. Do not touch the interior portion of the lamp, this will damage the lamp.

8. Place mounted lamp into bracket by matching the painted area on the lamp retainer to the painted area on the lamp bracket. This is critical to ensure that the lamp is properly oriented in unit.

9. Finger-tighten thumb screws.

10. Firmly plug in the lamp.

11. Replace panel in unit.

12. Finger-tighten knobs.

Please refer the manufacturer's Operating Instructions for more information on use or lamp replacement.

ELP 19.7.0. FUMING TORCH

REFERENCES:

FIVIS by 3M , Technical Note, Lightning Powder Co., (March, 1994).

ULTRATORCH, Lynn Peavey Co., Catalog (1999).

MATERIALS:

- Fuming Wand
- Butane Refill
- Fuming Cartridges

INTRODUCTION:

The super-glue fuming torch is a method used to process items for the acceptance of powders and dye-stains which enable visualization of the latent prints. Some of the advantages to using the wand over other super-gluing methods are that it can easily be directed at a small portion of a large object, or for quickly fuming small objects. It can also be useful for processing the insides of vehicles either in their entirety or in part.

PROCEDURE:

See Lightning Powder Co. Technical Notes dated March, 1994 for complete operating instructions and recommendations.

ADDITIONAL INFORMATION:

Additional caution must be taken when using this method because it is easy to over fume objects.

Safety: if used in a closed area or small room, respiratory protection is necessary in the form of a fume hood, vent fan system or un-vented goggles and personal organic vapor respirator with dust/mist pre-filter.

Warning, the tip of the wand and the cartridges become very hot during use and may cause severe burns if touched.

ELP 19.8.0. COLEMAN VACU-PRINT

REFERENCES:

Coleman Vacu-Print Instruction and Notes, Lightning Powder Co. (August, 1999).

MATERIALS:

- Coleman Vacu-Print Table-top Chamber
- Coleman Vacu-Print Long (rifle) Chamber
- Vacuum Pump/Motor with hose
- Dual Connector
- Vacuum Pump Oil, one quart

INTRODUCTION:

The Coleman Vacu-Print equipment allows for super-glue fuming of evidence in an air-evacuated, sealed chamber. This method allows for shorter fuming times, requires a smaller amount of super-glue, and does not require the addition of moisture. Vacuum fuming deposits a thinner layer of super-glue on the item, which may be more conducive to dye- staining. This method has proven very successful for fuming plastic bags as they do not have to be unfolded or have large amounts of space in between them.

PROCEDURE:

See Lightning Powder Co. Technical Notes dated August, 1995 for complete operating instructions and maintenance requirements.

ADDITIONAL INFORMATION:

Safety: "Do not place pressurized items such as sealed soda cans, sealed glass bottles, or aerosol cans in the chamber. They can expand rapidly or explode as air pressure is evacuated from the chamber, potentially causing injury" (Lightning Powder Co.).

ELP 19.9.0. CIMAREC STIRRING HOT PLATE

REFERENCE:

Cimarec Stirring Hot Plates Operation Manual and Parts List, Thermolyne (1993).

MATERIALS:

- Stirring/hot plate
- Stir bar

INTRODUCTION:

The Cimarec stirring hot plate is a general-purpose stirring/heating device intended for laboratory use.

PROCEDURE:

Place a flat bottomed vessel on the plate, add the required chemicals for the specific reagent being mixed, place the magnetic stir bar in the vessel, and slowly turn the dial labeled "STIR" until a satisfactory agitation rate is reached.

None of the reagents currently used in the Latent Section require the addition of heat to facilitate mixing.

ADDITIONAL INFORMATION:

Safety: always use a properly grounded (three pronged) outlet and disconnect from the power supply before attempting any maintenance.

APPENDICES

Appendix A FORMULARY

AMIDO BLACK

Working Solution:

3-5 grams Amido Black
100 ml Glacial Acetic Acid
900 ml Methanol

Rinse Solution:

100 ml Glacial Acetic Acid
900 ml Methanol

May also use distilled water after Rinse Solution

Amido Black 10B
Amido Black 12B
Napthol Blue Black
Naphathlene Black

Buy top grade of all Chemicals.
The shelf life of Amido Black is indefinite.

NINHYDRIN (Ozone Safe)

Working Solution:

30 ml concentrate	X 4 = 120 ml
Fill to 1 liter with N-Hexane	X 4 = 4 liters
Clarify with 2- Propanol if needed	

Stock Solution (concentrate):

1st 300 ml 2-Propanol	X 2 = 600 ml
2nd 100 ml Acetic Acid	X 2 = 200 ml
3rd 50 grams Ninhydrin	X 2 = 100 g

Stir with magnetic stirrer (may take up to an hour to dissolve).

The development of latent prints with ninhydrin requires a warm moist environment. Carefully monitor the development of latent prints, so that they do not become over developed.

RHODAMINE 6 G

Working Solution:

0.1 gram	Rhodamine 6G
1 liter	Methanol

Place approximately 0.1 gram of Rhodamine 6G into a 1-liter plastic spray bottle and add approximately 1-liter of Methanol, then gently agitate to mix the R6G and Methanol.

Rinse Solution:

1-liter of Methanol in a 2nd plastic spray bottle.

The shelf life of Rhodamine 6G is indefinite.

PHYSICAL DEVELOPER KITS

Working Solution:

5 ml Solution "A" (20% silver nitrate solution) to
90 ml of solution "B" (reductant solution)

Stir working solution for approximately 1 minute with glass or plastic stirring rod.

This is a working solution of 18:1. For a larger quantity of working solution just add 5 ml of solution "A" to every 90 ml solution "B". If needed, all of bottles "A" and "B" can be mixed together.

Do not mix the working solution until ready to use, as it has a short shelf life once mixed.

SMALL PARTICAL REAGENT

Working Solution:

1. Place a 1500 ml beaker on the stirrer base.
2. Add 1000 ml distilled water to the beaker.
3. Put an appropriately sized stir bar in the beaker.
4. Dissolve 30 g of MoS2 in the water. (MoS2 comes in 30g bottles)
5. Add 3 to 4 drops of Photo Flo 200 to the solution.

The shelf life on Small Particle Reagent is approximately two to three months.

SUDAN BLACK

Working Solution:

1. Place 15 grams of Sudan Black powder into a 2-liter glass beaker.
2. Add 1-liter methanol and stir with plastic stirring rod.
3. Add 500 ml of distilled water to the beaker and stir with the stirring rod.

The working solution has an indefinite shelf life.

1,8 - DIAZAFLUOREN - 9 - ONE (DFO)

Stock Solution:

1. 0.5 gram DFO
2. 100 ml Methanol
3. 100 ml Ethyl Acetate
4. 20 ml Acetic Acid

Total 220 ml solution

Working Solution:

1. 220 ml DFO stock solution
2. 780 ml Petroleum Ether

Total 1000 ml solution

Do not mix the working solution until ready to use.
Formula can be cut in half if needed.

STICKY-SIDE POWDER

Working Solution:

1. Place 1 tsp. Sticky-Side Powder into a shallow jar
2. Fill a brown dropper-bottle half full of water and half full of Photo-Flo 200 and shake well.

Using the dropper, add this solution to the powder in the shallow jar until you have a paste with the consistency of thin paint.

GENTIAN VIOLET

Working Solution:

1. Weigh out 1 gram of powered Gentian Violet
2. Measure out 1000 ml of distilled water and pour into a glass tray.

Add the Gentian Violet to the distilled water slowly. Stir using a stirring device for

approximately twenty-five minutes.

*It should be noted that exact measurements and portions when preparing chemical solutions are desirable for consistent quality, but successful results in developing latent fingerprints are not dependent upon unequivocal accuracy. There is a margin of error in preparing chemical solutions for latent fingerprint techniques without adversely affecting the successful development of latent prints.

Appendix B SUPPLIES

1. Brushes

1.1. A wide variety of types, shapes, and sizes of brushes are available for processing evidence with powders. The supply of different kinds of brushes required in the Latent Print Section depends on the colors and types of powders used. An ample number of appropriate brushes will help to preclude cross-contamination of powders and brushes. While larger brushes are ordinarily used for large areas and smaller brushes on concentrated work or individual latent prints, fiberglass brushes are often used for both instances.

1.2. The four primary categories of brushes are feather, fiberglass, hair, and magnetic.

1.3. Brushes are available commercially, see list of suppliers.

2. Lifting Materials

2.1 Lifting materials for latent fingerprint work consist primarily of transparent or opaque adhesive coated materials. All are available commercially.

2.2 Tape - special latent print lifting tape comes in both transparent or frosted, and is available in a number of different widths.

2.3. Hinge lifts -consist of a transparent lifting medium (tab) attached to clear, black, or white plastic backing tabs.

2.4. Rubber lifters – are available in black or white with transparent covers.

2.5. Gelatin lifts -are available in black, white, or transparent backgrounds and come in various sizes.

3. Magnifying Glasses

3.1. Fine quality magnifying glasses are essential to latent print examination work. The usual magnification is approximately 4.5 times. Henry, Battley and other types of reticules are marketed to fit these magnifying glasses.

3.2 Head mounted magnifying glasses are useful during certain processing and examination procedures. These units are available commercially.

3.3. Magnifying glasses should be cleaned with commercially available window/lens cleaner. No caustic chemicals should be applied to the lens.

4. Powders

4.1. Many commercially produced latent print "dusting" powders are available and many are very similar from company to company. No powder is universally applicable to all types of non-porous surfaces and most examiners need to stock a variety of types and colors of powders for specialized applications.

5. Miscellaneous Items

5.1. Glassware- specific types of glassware (beakers, graduated cylinders, pipettes, etc.) required for chemical processing are available commercially.

5.2. Stirring devices - glass stirring rods, magnetic stirrers, plastic stirring rods, etc., are available commercially.

5.3. Forceps - tweezers, forceps and tongs are all available commercially.

5.4. Storage bottles - glass and plastic bottles are available commercially.

5.5 Pans and dishes - glass, ceramic, plastic, or metal pans are available commercially.

5.6. Personal protective equipment - lab coats, gloves (latex, vinyl, cotton, etc.), safety glasses, alternate light source goggles, respiratory masks, booties, etc., are all available commercially.

5.7. Maintenance of these items should be conducted during use and cleaning. Any items that become cracked, strained, scratched, or torn, causing them to be unserviceable or non-protective, should be disposed of and replaced.

Appendix C SECURITY/SAFETY

Appendix C-1 EMERGENCY NOTIFICATION

Supervisor Raymond A. York FS	Work 884-7148 Home 344-2473 Latent Section Rotating Pager # 391-2360
Manager Rachel Farnsworth FS	Work 884-7171 Home 288-2240
Major Ralph W. Powell FS	Work 884-7207 Home 884-8967
Assistant Deputy Director Saundra DeKlotz	Work 884-7003 Home 336-3595 Cell 867-2275

FIRE **POLICE** **AMBULANCE**	**911**
POISON CONTROL	**1 800 860 0620**

Appendix C-2 LAB OPENING AND CLOSING PROCEDURES

OPENING

Each person must use their assigned 4-digit code plus # to enter the door and turn off the alarm.

If you are the only person in the Latent Fingerprint Section, re-lock the door after entering, and turn on all the lights.

The lab door to BCI is to remain closed and locked at all times, as is the door to the evidence vault.

CLOSING

The last person to leave needs to secure the front door by locking and alarming it.

The last latent examiner to leave must do the following:

- Turn off the fume hoods.
- Turn off the lights and the Gallenkamp in the photo lab.
- Lock chemical lab and powder lab doors.
- Check to make sure all irons are off and unplugged.
- Check to make sure all bag sealers are turned off over the weekend.
- Make sure forensic lights and alternate light sources are turned off.
- Turn off lights in the digital lab.
- Make sure all fans are turned off.
- Turn off all lab lights.
- Make sure all computers are turned off.
- Each examiner should lock their own evidence cabinet.

Appendix C-3 FIRE ALARM EVACUATION PLAN

When an alarm is sounded (fire bell), all persons will evacuate the building using the following routes:

Photo Lab
Examiner's office areas
Digital Lab
Chemical Lab
Latent Processing/Powder Lab
Supervisor's office
Evidence reception area

EXIT: west door commonly known as the employee/evidence receiving door.

If exit is blocked, employees will evacuate through the next nearest exit.

Upon evacuating the building, employees will gather at the **flag poles** and await further instructions. A head count will be taken.

To assist with the evacuation of the building, the following persons are responsible for the following assignments:

Section Supervisor will ensure everyone is clear of the section. (Alternate - Latent Examiner Sr.)

Latent Section Safety Officer will act as monitor and ensure all doors have been closed and locked. (Alternate - Latent Examiner Sr.)

Appendix C-4 SPILL CONTROL

General Spill Safety Procedures

- Attend to any persons who may have been contaminated.
- Notify persons in the immediate area about the spill (post a sign).
- Evacuate all non-essential personnel from the spill area.
- If the spilled material is flammable, turn off ignition and heat sources.
- Avoid breathing vapors of the spilled material. If necessary, use a respirator.
- Leave on or establish exhaust ventilation if it is safe to do so.
- Secure supplies to effect clean-up.
- During the clean up, wear appropriate apparel.

GENERAL CLEAN-UP PROCEDURES

Liquid Materials

- Absorb liquid materials onto an inert spill pillow or absorbent/kitty litter.
- Place spill pillow or absorbent into a sealed container.
- Mark container with chemical composition if known.

Solid Materials

- Sweep up and place in a sealed container.
- Mark container with chemical composition if known.

Acids

Cover the contaminated area with a neutralizing compound such as sodium bicarbonate or soda-ash and slaked lime mixture (50:50), or a spill pillow. When using the neutralizing compounds, it is possible to mix with water and make a slurry. After application to the spill, it is possible to scoop up the mixture and wash down the drain using an excess of water.

Bases or Alkalis

Solids should be swept up, diluted with water, and neutralized with 6M HCL in a large plastic container. After this process is completed, the solution may be washed down the sink using an excess of water. Solutions can be neutralized with acid and mopped up, or absorbed with a spill pillow. Again, the mixed solution may be discarded down the drain using an excess of water. Care should be taken when adding acids to strongly basic solutions as a strong exothermic reaction could occur, resulting in these materials contacting the individual.

Flammables and Combustibles

Eliminate all sources of ignition and heat that exist nearby. Clean-up should follow recommended procedures for the compound in question.

If you are not sure how to clean something up, consult the [redacted]. Accidental release/spill/leak procedures are highlighted in [redacted].

Appendix C-5 CLANDESTINE LABORATORY SAFETY

Refer to the Idaho State Police Forensic Services Health and Safety Manual.

- Response Plan
- Personal Protective Equipment
- Safety
- Site Control & Decontamination
- Site Emergencies
- Incident Reporting
- Terms
- Resource Agencies

Appendix C-6 SAFETY

Refer to the following manuals for in-depth safety issues.

- Forensic Services Standard Operating Procedures
- ISPFS Health and Safety Manual
- MSDS Book

Appendix D MEASUREMENTS/TABLES AND EQUIVALENTS

METRIC EQUIVALENTS:

DRY:

1 pound (lb)	= 453.6 grams (g)
1 ounce (oz)	= 28.35 grams (g)
1 gram (g)	= 0.035 ounces (oz)
1 milligram (mg)	= 0.001 grams (g)

LIQUID:

1 milliliter (ml) (cc)	= 0.034 fluid ounces (oz)
1 liter (l)	= 1000 milliliters (ml)
1 fluid ounce (oz)	= 29.573 milliliters (ml)
500 milliliters (ml)	= .5 (1/2) liter (l)
1 gallon (gal)	= 3.79 liters (l)

Appendix E REFERENCES

Advances in Fingerprint Technology, Henry C. Lee & R.E. Gaensslen

American Society of Crime Laboratory Directors (ASCLD), Accreditation Manual

Chemical Formulas and Processing Guide for Development of Latent Fingerprints, U.S. Department of Justice, Federal Bureau of Investigation

Criminal Investigation, Basic Perspectives, Paul B. Weston and Kenneth M. Wells

Idaho State Police, Forensic Services, Health and Safety Manual

Department of Law Enforcement, Idaho State Police, Policies Manual

Idaho State Police, Forensic Services, Procedure Manual

Effective Expert Witnessing, Jack V. Matson

Federal Bureau of Investigation Advanced Latent Fingerprint School Text

Federal Bureau of Investigation Fingerprint Training Manual, Identification Division Technical Section

Fingerprints, Palms, and Soles, An Introduction to Dermatoglyphics, Harold Cummins and Charles Midlo

Fingerprint Techniques, Andre A. Moenssens

Fingerprints and the Law, Andre A. Moenssens

Forensic Image Tracking System, More Hits User Manual

An Introduction to Lasers, Forensic Lights and Fluorescent Fingerprint Detection Techniques, Dr. E. Roland Menzel

Journal of Forensic Identification, International Association for Identification

Kodak Professional DCS 420 Digital Camera User's Guide, Eastman Kodak Co.

Kodak Professional DCS Cameras Quick Guide 12/05/96, Eastman Kodak Co.

Law for the Expert Witness, Daniel A. Bronstein

Lightning Powder Co. Technical Notes

Manual of Fingerprint Development Techniques, Police Scientific Development Branch, Home Office U.K.

Nikon N90 Instruction Manual

Omniprint 1000A Operating Instructions, Mell es Griot

Safety Guidelines, International Association for Identification

The Science of Fingerprints, U.S. Department of Justice, Federal Bureau of Investigation

Scott's Fingerprint Mechanics, Robert D. Olsen Sr.

Technical Notes - Lightning Powder Co.

Techniques of Crime Scene Investigation, Barry A.J. Fisher

INFORMATION FOR THIS MANUAL AND ANY ADDITIONAL INFORMATION REGARDING ANY OF THE TECHNIQUES DESCRIBED HEREIN CAN BE FOUND IN THE LATENT PRINT SECTION LIBRARY.

Appendix F RECOMMENDED TRAINING FOR A LATENT FINGERPRINT EXAMINER (BASIC TO ADVANCED)

1. Fingerprint Classification
   FBI 40 hrs.

2. Advanced Latent Fingerprint Techniques and Chemical Processing
   FBI 40 hrs.

3. Advanced Palm Print Identification
   International Association for Identification. 24 hrs.

4. Digital Image Workshop
   Forensic Identification Training seminars, Ltd. 40 hrs.

5. Advanced Ridgeology Comparison Techniques
   Forensic Identification Training Seminars, Ltd. 40 hrs.

6. Mastering Expert Testimony
   Forensic Identification Training Seminars, Ltd. 40 hrs.

7. Rynerson & Chison Homicide Investigation School
   Location to be announced. 60 hrs.

8. Administrative Advanced Latent Fingerprint School
   FBI Academy Quantico, VA. 120 hrs.

9. D.E.A. Clan-Lab Certification Course
   Location to be announced. 40 hrs.

10. P.O.S.T. Instructor Development Course
    P.O.S.T. Meridian, ID 32 hrs.

11. Latent Fingerprint Photography
    FBI Academy Quantico, VA. . 80 hrs.

12. Basic Black & White Photography workshop
    Nicon/Kodak Law Enforcement Photography.

13. International Association for Identification Annual Education Conferences (Held Nationwide).

14. Pacific Northwest Division of IAI meetings and training conferences (Held in the Northwest).

15. International Association for Identification Latent Print Certification (CLPE).

16. Crime Scene Technician, (CST) Level I

17. Crime Scene Analyst, (CSA) Level II

18. Senior Crime Scene Analyst Level III

All class hours are approximated.

Appendix G MANUFACTURES AND/OR DISTRIBUTORS OF FINGERPRINT EQUIPMENT (DECEMBER, 1999)

ACE Fingerprint Equipment Laboratories, Inc
P.O. Box 288
Wake Forest, NC 27588
Phone 1-800-426-7072
Fax 1-919-556-6176
E-Mail acefel@mindspring.com
Fingerprint Equipment and Accessories

Aldrich
1001 West Saint Paul Ave
Milwaukee, WI 53233
Phone 1-800-558-9160
Fax 1-800-962-9591
Scientific Equipment

Fisher Scientific Laboratories
711 Forbes Ave
Pittsburgh, PA 15219-9919
Phone 1-800-766-700
Fax 1-800-926-1166
Scientific Equipment and Supplies

GRAINGER
5576 Irving Street
Boise, ID 83706-1288
Phone 1-208-377-2801
Fax 1-208-375-0869
Industrial and Commercial Equipment and Supplies

Identicator Corp.
4051 - T Glencoe Ave.
Marina Del Rey, CA 90292
Phone 1- 310-305-8181
Fax 1-310-578-1910
Fingerprint Equipment and Accessories

Kinderprint Company, Inc.
P.O. Box 16
Marinez, CA 94553
Phone 1-800-227-6020
Fingerprint Equipment and Accessories

Lightning Powder Co., Inc.

1230-T Hoyt St. SE
Salem, OR 97302
Phone 1-800-852-0300
Fax 1-503-588-0398
Fingerprint Equipment and Accessories

Lynn Peavy Co.
11148 Thompson Ave.
P.O. Box 14100
Lenexa, KS 66215
Phone 1-800-255-6499
Fingerprint Equipment and Accessories

Melles Griot
2251 Rutherford Road
Carlsbad, CA 92008
Phone 1-800-645-2737
Fax 1-760-438-5208
E-Mail mnolte@aol.com
Fingerprint Equipment and Accessaries

SIRCHIE Finger Print Laboratories, Inc
100 Hunter Place
Youngsville, NC 27596
Phone 1-800-356-7311
Fax 1-800-899-8181
E-Mail sirchie@nando.net
Fingerprint Equipment and Accessaries

RICE SAFETY EQUIPMENT CO.
5500 West Howard
Skokie, IL 60077
Boise, ID Phone 1-800-452-7433
Fax 1-208-378-4929
Safety Equipment and Accessories

Idaho State Police
Forensic Services

Approval for Quality System Controlled Documents

LP AM Rev 3

1/12/07 - 5/15/07

Discipline/Name of Document: Latent Section Analytical Method

Revision Number: 3

Issue Date: 01/12/2007

APPROVED BY: _____ 1/12/2007
Quality Manager Date Signed

IDAHO STATE POLICE FORENSIC SERVICES
LATENT PRINT SECTION
ANALYTICAL METHOD

HISTORY PAGE

The original version of the Latent Fingerprint Section SOP Manual is dated August 30, 2000.

Revision 1, revised from revision 0 was effective July 13, 2001.

Revision 2, revised from revision 1 was effective December 27, 2001.

Revision 3, the entire manual was reviewed and revised from revision 2. Revision 3 is effective January 12, 2007.

Approval _____ Date _____

Approval _____ Date _____

IDAHO STATE POLICE FORENSIC SERVICES
LATENT SECTION ANALYTICAL METHOD

TABLE OF CONTENTS

1 BACKGROUND/SCOPE

1.1 The discipline of Latent Print Analysis is the process of determining whether a particular area of friction ridge skin produced a particular latent print.

1.2 It is a discipline based on the development and comparison of multiple levels of detail such as pattern type, ridge characteristics (also known as minutiae), ridge shapes, etc. between a latent print and a known print.

1.3 When there is agreement between the details in a latent or questioned print and those in the known print, without any unexplainable dissimilarities, an identification (individualization) can be declared.

1.4 The principles behind latent print evidence are: Friction Ridge Skin (FRS) is permanent, in that it does not change naturally throughout one's life and Friction Ridge Skin is unique and individual, no two areas of FRS have been found to possess identical ridge characteristics.

1.5 This Analytical Method defines both technical procedures for processing the majority of evidence encountered by the Latent Print Discipline and comparison methodology.

1.5.1 These methods will describe procedures and techniques that are routinely used in the examination of evidence.

1.5.2 These methods cannot be expected to address each and every situation or type of evidence encountered.

1.5.3 The individual analyst must exercise sound judgment in selecting the methods which will best suit the requirements of the evidence submitted in a specific case; therefore, the procedures are designed to accommodate the majority of evidence encountered.

2 REFERENCES

ASCLD/LAB - International, March 2004, Rev. 0, *Supplemental Requirements for the Accreditation of Forensic Science Testing and Calibration Laboratories.*

International Laboratory Accreditation Cooperation (ILAC), Guide 2 - Traceability of Measurements of Measurement Results, 2002.

International Organization of Standardization (ISO)/International Electrochemical Commission (IEC), ISO/IEC17025 - *General requirements for the competence of testing and calibration laboratories*, 2005 (ISO/IEC 17025:2005(E).

The Scientific Working Group on Friction Ridge Analysis, Study and Technology (SWGFAST) - *SWGFAST documents are officially published in the Journal of Forensic Identification*, 2006.

Idaho State Police Forensic Services – Quality Manual ISO/IEC 17025:2005 Compliant.

3 DEFINITIONS

ACE-V
Comparison methodology consisting of Analysis, Comparison, Evaluation, and Verification.

AFIS
Automated Fingerprint Identification System.

ALTERNATE LIGHT SOURCE (ALS)/FORENSIC LIGHT SOURCE
Any light source, other than a laser, used to excite luminescence of latent prints, body fluids, etc.

ANALYSIS
The methodical examination of friction skin impressions; separation into parts so as to determine the nature of the whole.

ARCH - PLAIN
A fingerprint pattern in which the ridges enter on one side of the impression, and flow, or tend to flow, out the other with a rise or wave in the center.

ARCH -TENTED
A type of fingerprint pattern that possesses either an angle, an up-thrust, or two of the three basic characteristics of the loop.

ARTIFACT
1. Any distortion or alteration not in the original friction ridge impression, produced by an external agent or action.
2. Any information not present in the original object/image, inadvertently introduced by image capture, processing, compressions, transmission, display or printing.

BIFURCATION
The point at which one friction ridge divides into two friction ridges.

CHARACTERISTICS/MINUTIAE
Features of the friction ridges. Commonly referred to as minutia(e), Galton detail, point, feature, ridge formation, or ridge morphology (dot, bifurcation, and ending ridge).

CLARITY
Visual quality of a friction ridge impression.

CLASS CHARACTERISTICS
Characteristics used to put things into groups or classes (e.g., arches, loops, and whorls).

CLASSIFICATION
Alpha/numeric formula of finger and palm print patterns used as a guide for filing and searching.

COMPARISON
The observation of two areas of friction ridge impressions for finding similarities and/or differences.

CORE
The approximate center of a pattern.

CREASE
A line or linear depression; grooves at the joints of the phalanges, at the junction of the digits and across the palmar and plantar surfaces that accommodate flexion.

DELTA
That point on a ridge at or nearest to the point of divergence of two type lines, and located at or directly in front of the point of divergence.

DERMIS
The layer of skin beneath the epidermis.

DISCREPANCY/DISSIMILARITY
A difference in two friction ridge impressions due to different sources of the impressions (exclusion).

DISTORTION
Variances in the reproduction of friction skin caused by pressure, movement, force, contact surface, etc. Distortion is not a discrepancy and is not a basis for exclusion.

DOT
An isolated ridge unit whose length approximates its width in size.

EDGEOSCOPY
Study of the morphological characteristics of friction ridges; contour or shape of the edges of friction ridges.

ELASTICITY
The ability of skin to recover from stretching, compression, or distortion.

ELIMINATION PRINTS
Exemplars of friction ridge skin detail of persons known to have had access to the item examined for latent prints.

ENDING RIDGE
A single friction ridge that terminates within the friction ridge structure.

EPIDERMIS
The outer layer of the skin.

ERRONEOUS IDENTIFICATION
The incorrect determination that two areas of friction ridge impressions originated from the same source.

EVALUATION
The determination of the significance, value, or clarity of a friction ridge impression by careful observation and study.

EXCLUSION
The determination that two areas of friction ridge impressions did not originate from the same source (non-identification).

FINGERPRINT
An impression of the friction ridges of all or any part of the finger.

FOCAL POINTS
Those areas that are enclosed within the pattern area of loops and whorls. They are also known as the core and the delta.

FRICTION RIDGE
A raised portion of the epidermis on the palmar or plantar skin, consisting of one or more connected ridge units of friction ridge skin.

FRICTION RIDGE DETAIL (MORPHOLOGY)
An area comprised of the combination of ridge flow, ridge characteristics, and ridge structure.

FRICTION RIDGE UNIT
Single section of friction ridge containing one pore.

FURROWS
Valleys or depressions between the friction ridges.

GALTON DETAILS
Term referring to friction ridge characteristics attributed to the research of English fingerprint pioneer, Sir Francis Galton.

HENRY CLASSIFICATION
A system of fingerprint classification named for Sir Edward Richard Henry.

IAFIS
Integrated Automated Fingerprint Identification System. The FBI's national AFIS.

INCIPIENT RIDGE
A friction ridge not fully developed which may appear shorter and thinner in appearance than fully developed friction ridges (interstitial, nascent).

INCONCLUSIVE
The inability to either individualize or exclude an area of friction ridge detail.

INDIVIDUALIZATION/IDENTIFICATION
The determination that corresponding areas of friction ridge impressions originated from the same source to the exclusion of all others.

INTERVENING RIDGES
The number of friction ridges between two characteristics.

KNOWN PRINT (FINGER, PALM, FOOT)/EXEMPLAR
A recording of an individual's friction ridges with black ink, electronic imaging, photography, or other medium on a contrasting background.

LATENT PRINT
Transferred impression of friction ridge detail not readily visible; generic term used for questioned friction ridge detail.

LEVEL 1 DETAIL
Friction ridge flow and general morphological information.

LEVEL 2 DETAIL
Individual friction ridge paths and friction ridge events (e.g., bifurcations, ending ridges, and dots).

LEVEL 3 DETAIL
Friction ridge dimensional attributes , e.g., width, edge shapes, and pores.

LIFT
An adhesive or other medium on which recovered friction ridge detail is preserved.

LIVE-SCAN
Electronic recording of friction ridges (fingers and/or palms).

LOOP - ULNAR
A type of pattern in which one or more ridges enter upon either side, re-curve, touch or pass an imaginary line between delta and core and pass out, or tend to pass out, on the same side the ridges entered. The flow of the pattern runs in the direction of the ulna bone of the forearm (toward the little finger).

LOOP - RADIAL
A type of pattern in which one or more ridges enter upon either side, re-curve, touch or pass an imaginary line between delta and core and pass out, or tend to pass out, on the same side the ridges entered. The flow of the pattern runs in the direction of the radius bone of the forearm (toward the thumb).

MAJOR CASE PRINTS/COMPLETE FRICTION RIDGE EXEMPLARS
A systematic recording of all of the friction ridge detail appearing on the palmar sides of the hands. This includes the extreme sides of the palms, joints, tips, and sides of the fingers. Under special circumstances complete friction ridge exemplars may also need to be taken from the plantar portion of the feet.

MATRIX
The substance that is deposited by the finger.

MISSED IDENTIFICATION
The failure to make an identification (individualization) when, in fact, both friction ridge impressions are from the same source.

NCIC CLASSIFICATION
An alpha/numeric system of fingerprint classification.

NON-POROUS
Non-absorbent.

PATENT PRINT
Friction ridge impression of unknown origin, visible without development.

PATTERNS
The designation of friction ridge skin into basic categories of general shapes.

PLASTIC PRINT
Friction ridge impression of unknown origin that is impressed in a soft substrate to create a three-dimensional impression.

PORES
Small openings in the skin through which perspiration is released.

POROSCOPY
A study of the size, shape, and arrangement of pores.

POROUS
Absorbent.

PRESERVED
Casting, photography, lifting, or other method used to capture latent impressions for further examination.

QUALIFIED ANALYST
Is an individual who has completed the internal training program, passed competency testing, and been approved to perform case work.

QUALITATIVE
The clarity of information contained within a friction ridge impression.

QUANTITATIVE
The amount of information contained within a friction ridge impression.

REAGENT
Substance used in a chemical reaction to detect, examine, measure, or produce other substances.

RELATIVE POSITION
Proximity of characteristics to each other.

RIDGE FLOW
A series of adjacent friction ridges in a directional arrangement. Level 1 detail.

RIDGE PATH
The directional flow of a single friction ridge. *Level 2 Detail.*

RIDGEOLOGY
The study of the uniqueness of friction ridge skin and its use for personal identification (individualization).

SEQUENTIAL PROCESSING
Use of a series of development methods in a specific order to maximize development of friction ridge detail.

STOCK SOLUTION
Concentrated solution diluted to prepare a working solution.

SUBSTRATE
Surface upon which a friction ridge impression is deposited.

SUFFICIENCY
The analyst's determination that adequate unique details of the friction skin source exist in the impression to support the conclusion.

VERIFICATION
Confirmation of an analyst's conclusion by another qualified analyst.

WHORL - ACCIDENTAL
A fingerprint pattern consisting of two different types of patterns, with the exception of the plain arch, with two or more deltas; or a pattern which possesses some of the requirements for two or more different types; or a pattern which conforms to none of the definitions.

WHORL - CENTRAL POCKET LOOP
A type of fingerprint pattern which has two deltas and at least one ridge which makes, or tends to make, one complete circuit, which may be spiral, oval, circular, or any variant of a circle. An imaginary line drawn between the two deltas must not touch or cross any recurving ridges within the inner pattern area.

WHORL - DOUBLE LOOP
A type of fingerprint pattern that consists of two separate loop formations with two separate and distinct sets of shoulders and two deltas.

WHORL - PLAIN
A type of fingerprint pattern which consists of one or more ridges which make, or tend to make, a complete circuit, with two deltas, between which, when an imaginary line is drawn, at least one recurving ridge within the inner pattern area is cut or touched.

WORKING SOLUTION
Solution at the proper dilution for processing.

4 RESPONSIBILITIES

4.1 The Latent Program Supervisor is responsible for ensuring that personnel adhere to established analytical methods, safety practices, and laboratory policies and procedures.

4.2 The Latent Program Supervisor shall ensure that analyst's training records are on file in the latent section.

4.3 Individual analysts are responsible for adherence to established analytical methods, safety guidelines, and laboratory polices and procedures.

4.4 Latent print analyst duties include, but are not limited to:

- 4.4.1 Development of friction ridge impressions;
- 4.4.2 Documentation of visible or developed friction ridge impressions;
- 4.4.3 Analysis, comparison, and evaluation of friction ridge impressions;
- 4.4.4 Verification of compared friction ridge impressions;
- 4.4.5 Issuing reports of examination activities;
- 4.4.6 Performing technical and administrative casework reviews;
- 4.4.7 Obtaining known exemplars from living and deceases subjects;
- 4.4.8 Responding to crime scenes to the extent to which they are trained;
- 4.4.9 Satisfactorily completing annual proficiency tests;
- 4.4.10 Presenting expert testimony in court.

5 EVIDENCE HANDLING PROCEDURES

5.1 Evidence handling will be in accordance to ISPFS Quality/Procedure Manual Section 5.8 HANDLING ITEMS OF EVIDENCE.

5.2 In order to ensure a correct count, money shall be counted by the analyst and witnessed by one other person when first opened (if possible) and again when it is resealed.

5.3 Evidence that contains a measurable amount of a controlled substance will not be accepted in the Latent Section.

5.3.1 Officers delivering evidence in person will be requested to separate out the substance prior to submission.

5.3.2 If a controlled substance is received in the Latent Section via the U.S. Mail or UPS it will be returned to the agency without being processed.

5.3.2.1 The submitting agency will be contacted, advised of this policy, and requested to resubmit the item only after the controlled substance has been removed.

5.4 Submission of hands, fingers, or feet of deceased persons to the Latent Section shall only occur when normal printing procedures have failed or cannot be applied due to decomposition.

5.4.1 Hands, fingers, or feet should only be removed by the attending medical examiner/coroner or under their authority and supervision.

5.4.2 When possible, it is desirable to have the hands severed at the wrist, and forwarded in their entirety. This eliminates the possibility of getting fingers mixed up or incorrectly labeled. If it is not possible to send the hands, the fingers may be submitted. Fingers should be severed at the palm, placed in individual containers, and immediately labeled as to which finger it is.

5.4.3 It is requested that hands, fingers, etc. be submitted as soon as possible in the same condition as found. If the hands were immersed in water, transport in water. If found dried out, place in an airtight container and transport without using any preservative.

5.4.4 Tissue should be refrigerated if possible.

5.4.5 **Do not use a formaldehyde solution** to preserve the tissue as it causes it to become brittle and hard, making the task of obtaining identifiable prints very difficult.

5.4.6 Body parts received by the lab shall be sealed and placed in an evidence refrigerator or freezer.

5.4.7 Biological evidence shall be promptly returned to the submitting agency after being processed.

5.5 Latent print processing has the potential to irreparably damage items of evidence.

5.5.1 If an item is suspected to have great value (monetary or sentimental), the analyst should contact the submitting agency to explain potential damage and gain verbal approval prior to processing.

5.6 RETAINED EVIDENCE

5.6.1 Latent print evidence generated by the Latent Section shall be retained for future reference.

5.6.2 Latent lifts, photographs/digital images, and fingerprint cards/copies used to effect individualizations will be sealed in an envelope, logged in as retained evidence (LE – Latent Evidence), and stored in the vault.

5.6.3 Retained latent evidence is considered both evidence and examination documentation.

5.6.4 Retained evidence shall only be released at the request of the submitting agency's or prosecutor's representative. It shall be signed over to the agency representative taking custody of it.

6 GENERAL LATENT PROCESSING

6.1 Latent print evidence is processed according to the nature of the substrate (surface) to be processed.

6.1.1 Substrate types include porous, semi-porous, and non-porous.

6.1.2 Processing is generally carried out in a sequential manner employing methods appropriate to the substrate type.

6.2 Latent print evidence is also processed with regards to what the latent print matrix may consist of. For example a latent print may be composed of perspiration, blood, or a combination of both.

6.2.1 Eccrine sweat glands are most concentrated on the palmar portion of the hands and plantar portion of the feet. Secretions from these glands consist of 99.0 to 99.5 percent water and 0.5 to 1.0 percent solids (organic substances and inorganic salts).

6.2.2 Latent prints may also consist of fats and oils (sebum) secreted by the sebaceous glands. These glands are most concentrated on the nose, ear, and groin areas. They are not located on the palmar portion of the hands and plantar portion of the feet, but sebum may be transferred to them via contact with other portions of the body.

6.2.3 Fats, oils, and other contaminants may also be transferred to friction ridge skin by contact with sources external to the body.

6.3 For the purpose of this manual, latent print methods are divided into three categories; light based methods, physical methods, and chemical methods.

6.3.1 LIGHT BASED METHODS

6.3.1.1 Latent prints may be visualized through the use of various angles and wavelengths of light.

6.3.1.2 Visualization of latent prints through the use of forensic lighting methods is non-destructive and should be attempted prior to other processing methods.

6.3.2 PHYSICAL METHODS

6.3.2.1 The development of latent prints through the use of physical methods does not involve a chemical reaction between the impression and the method used.

6.3.2.2 Physical methods encompass dusting and other discoloration methods often relying on the adhesive quality of certain latent prints.

6.3.2.3 The taking of known exemplars from a living or deceased person shall be considered a physical method for the purposes of this manual.

6.3.3 CHEMICAL METHODS

6.3.3.1 The development of latent prints through the use of chemical methods occurs because of a chemical reaction between the latent print residue components and the reagent.

6.3.3.2 Reagents shall be tested after they are prepared and prior to use. If the same lot of working solution is used multiple times in the same day, only the initial control tests must be noted on the "ISP FS Latent Section Control Test Log". Subsequent use of the reagent use on the same day shall revert to the prior tests. Control test results shall also be recorded in the case documentation.

6.3.3.3 Traditional film development shall be considered a chemical method for the purposes of this manual.

7 QUICK REFERENCE SEQUENTIAL PROCESSING GUIDE

7.1 GENERAL EVIDENCE:

7.1.1 POROUS:

1. Visual: White light/Alternate Light Source (ALS)
2. Iodine Fuming
3. Visual: White light
4. Diazafluorenone DFO
5. Visual: ALS
6. Ninhydrin
7. Visual: White light
8. Physical Developer
9. Visual: White light

7.1.2 NON-POROUS:

1. Visual: White light
2. Cyanoacrylate Fuming
3. Visual: White light/ALS
4. Dye Stain
5. Visual: ALS or Ultraviolet light (UV) as required
6. Powders: Luminescent or non-luminescent
7. Visual: White light/ALS

7.2 BLOOD EVIDENCE:

7.2.1 POROUS:

1. Visual: White light/UV (fabric-background luminescence)
2. Amido Black or Ninhydrin
3. Visual: White light

7.2.2 NON-POROUS:

1. Visual: White light
2. Cyanoacrylate Fuming
3. Visual: White light
4. Amido Black or Ninhydrin
5. Visual: White light/ALS
6. De-stain/Rinse solution
7. Visual: ALS
8. Powders: Luminescent or non-luminescent
9. Visual: White light/ALS

7.3 CARTRIDGE CASES:

1. Visual: White light
2. Cyanoacrylate Fuming
3. Visual: White light/ALS
4. Dye Stain
5. Visual: ALS

7.4 GLOSSY PAPER/GLOSSY CARDBOARD:

1. Visual: White light
2. Iodine
3. Cyanoacrylate Fuming
4. Visual: White light/ALS
5. Powders: Luminescent or non-luminescent
6. Visual: White light/ALS
7. Ninhydrin
8. Visual: White light
9. Physical Developer
10. Visual: White light

7.5 HUMAN SKIN:

7.5.1 Decomposing and/or Macerated Friction Ridge Skin (water soaked)

1. Ink and/or powder lift method (if possible)
2. Photography

7.5.2 Mummified Friction Ridge Skin (dried)

1. Ink and/or powder lift method (if possible)
2. Photography
3. Casting
4. Attempt to re-hydrate

7.5.3 Burned Friction Ridge Skin

1. Photograph
2. Ink

7.6 LEATHER:

1. Visual: White light
2. Visual: ALS
3. Cyanoacrylate Fuming:
4. Visual: White light/ALS
5. Powders: Luminescent or non-luminescent
6. Visual: White light/ALS

7.7 PAINTED SURFACES:

1. Latex Paint: process as for porous evidence
2. Semi-gloss/enamel paint: process as for non-porous evidence

7.8 PHOTOGRAPHIC PAPER:

7.8.1 Glossy side (process first):

1. Visual: White light
2. Cyanoacrylate fuming
3. Visual: White light/ALS
4. Powders: luminescent or non-luminescent

5. Visual: White light/ALS

7.8.2 Reverse side (if paper) - process as for porous evidence

7.9 RUBBER/SYNTHETIC GLOVES:

1. Visual: White light
2. Iodine
3. Cyanoacrylate fuming
4. Visual: White light/ALS
5. Ninhydrin
6. Dye Stain
7. Visual: ALS
8. Powders: Luminescent or non-luminescent
9. Visual: White light/ALS

7.10 TAPE:

7.10.1 Non-adhesive side of all tapes:

1. Visual: White light
2. Cyanoacrylate Fuming
3. Visual: White light/ALS
4. Dye Stain
5. Visual: ALS
6. Powders: Luminescent or non-luminescent
7. Visual: White light/ALS

7.10.2 Adhesive side of tape (select method that contrasts with the color of the tape):

1. Visual: White light
2. Gentian Violet
3. Visual: White light
4. Small Partial Reagent or Stick Side Powder
5. Visual: White light

OR

1. Visual: White light
2. Cyanoacrylate Fuming
3. Visual: White light/ALS
4. Dye Stain
5. Visual: ALS

7.11 VARNISHED WOOD:

1. Visual: White light
2. Cyanoacrylate fuming
3. Visual: White light/ALS
4. Dye Stain (water solution)
5. Visual: ALS
6. Powders: Luminescent or non-luminescent
7. Visual: White light/ALS

7.12 WET SURFACES:

7.12.1 POROUS:

1. Visual: White light
2. Dry to room temperature
3. Visual: White light/ALS
4. Physical developer

7.12.2 NON-POROUS:

1. Visual: White light
2. Small Particle Reagent (SPR)
3. Visual: White light/ALS
4. Lift

8 LIGHT BASED METHODS

8.1 ALTERNATE LIGHT SOURCE

8.1.1 BACKGROUND:

Alternate light sources (ALS) are portable, multi-waveband, and tunable light sources that are used to enhance or visualize potential items of evidence. Latent impressions may be composed of various substances such as blood, perspiration, chemicals or other organic substances that react differently to different wavelengths of light. When a luminescent deposit is excited with a particular wavelength of light, the deposit absorbs the light and re-emits it at a different wavelength. The short-lived light being re-emitted is termed fluorescence. The ALS can also be used to detect the presence of certain body fluids such as semen and saliva. There are several alternate light sources available to analysts that adequately meet the needs described in this manual.

8.1.2 SCOPE:

8.1.2.1 The ALS is used to attempt to create contrast between an impression and the substrate it is on.

8.1.2.2 Fluorescence may occur due to a naturally occurring substance within the latent print residue itself (inherent luminescence), may be transferred to the friction ridge skin via contamination and re-deposited, or may be chemically induced in latent print residue with certain dyes and powders known to exhibit fluorescent properties. Fluorescence of the substrate may also occur.

8.1.3 EQUIPMENT AND MATERIALS:

Alternate light source
Filtered goggles

8.1.4 REAGENTS:

Not applicable

8.1.5 PROCEDURE:

8.1.5.1 Turn the power rocker switch on. The fan will begin to operate. Make sure the fan comes to full operating speed. You should be able to hear the fan come up to speed in a few seconds.

8.1.5.2 Turn on the lamp switch. The lamp should turn on in a few seconds. On some models, a ticking sound prior to the lamp engaging is normal.

8.1.5.3 Choose the band-width you wish to use. Some models have a variable power dial that may need to be adjusted.

8.1.5.4 Observe evidence with the appropriate wavelength/goggle combination:

< 400nm	yellow or clear UV safe
400-450nm	yellow
450-540nm	orange
540->700nm	red

8.1.5.5 Push the lamp rocker switch to off.

8.1.5.6 Wait for the unit to cool down. After feeling the body of the unit and the exhaust to determine that the unit is cool, the power rocker switch may be turned off.

8.1.6 ADDITIONAL INFORMATION:

8.1.6.1 The Omniprint 1000(A) is a monochromatic light source that has a range of 450-570 nm with one port of white light. When using the fiber optic cable, do not use the white light selection at full power for more than thirty seconds as this will damage the cable. The operator may unscrew the lens from the cable and attach the lens directly to the unit, allowing hands-free operation.

8.1.6.2 Allow the unit to run for longer periods of time instead of turning the unit off and on for short periods. Repeatedly turning the unit off and on will shorten the life of the lamp. The lamp should be left on for a minimum of ten-fifteen minutes.

8.1.6.3 Maintenance shall consist of cleaning the exterior of the ALS with a soft cloth dampened with a mild detergent solution and using a cotton swab moistened with glass cleaner to clean the optical filters. Bulbs should be replaced as needed.

8.1.6.4 If an ALS malfunctions, it will be taken out of service until it can be repaired. The ALS shall be tagged indicating that it is out of service. Maintenance, service, etc. will be recorded in the maintenance log.

8.1.6.5 No calibration is required of these units.

8.1.6.6 The manufacturer's operator manuals for this equipment shall be read prior to using the equipment.

8.1.7 CONTROLS:

Not applicable

8.1.8 SAFETY:

8.1.8.1 As with other electrical appliances, guard against electrical shock. This can be accomplished by ensuring that all connections are proper and that no loose, damaged, or frayed wires exist. Make sure the ALS is unplugged before attempting any maintenance and do not use outdoors if wet conditions exist.

8.1.8.2 The eyes are generally more vulnerable than the skin, and appropriate eye protection must be used to protect them. Permanent eye damage can occur from reflected, refracted, or direct illumination to the eye. Most of the light emitted by an

ALS is not absorbed, but is reflected and scattered off the surface being examined. Extreme care should be taken around highly reflective surfaces. Never look directly into the light or allow beams to bounce off the surface into your eyes or the eyes of another person in the vicinity. Filtered goggles or shields shall be utilized when using this equipment as they provide protection from potentially harmful rays and provide additional enhancement for viewing latent prints.

8.1.8.3 The nature and extent of all potential hazards are not yet known because in-depth assessments have not been made on most of the high intensity light sources used in forensic identification work.

8.1.9 REFERENCES:

Advances In Fingerprint Technology, Henry Lee and R. E. Gaensslen, pages 90, 115-118.

An Introduction to Lasers, Forensic Lights, and Fluorescent Fingerprint Detection Techniques, E. Roland Menzel, (1991).

Friction Ridge Skin, James E. Cowger, (1983), pages 106-107.

Omnichrome Evidence Detection with Forensic Laser Technology, (1989).

Omniprint 1000A Operating Instructions, Omnichrome.

Mini-CrimeScope Tunable Forensic Light Source Model MCS-400W Operation and Maintenance Instructions (2003).

8.2 KRIMESITE IMAGER

8.2.1 BACKGROUND:

The KRIMESITE IMAGER (KSI) is an image-intensifying device that locates untreated latent prints and other evidence of forensic interest on non-porous surfaces by utilizing Reflective Ultra-Violet Imaging System technology (RUVIS). Ultra-violet (UV) light will reflect off of a fingerprint at a different wavelength or speed than it will off the substrate. This creates contrast that you are able to visualize because the KSI system takes UV light and converts it to visible light.

8.2.2 SCOPE:

8.2.2.1 No treatment with powders or chemicals is necessary, however, use of the imager may greatly enhance results obtained by cyanoacrylate fuming.

8.2.2.2 The KSI is most effective on non-porous surfaces, but can detect recently deposited prints on some porous surfaces.

8.2.2.3 The KSI is not affected by ambient light, which means it can be used in daylight or total darkness, indoors or outdoors.

8.2.2.4 The most appropriate method to preserve KSI-located impressions is through photography.

8.2.2.5 The KSI system may be used in the laboratory or when providing technical field assistance.

8.2.3 EQUIPMENT AND MATERIALS:

Short wave 254 nm ultraviolet light source
Camera
Reflective Ultraviolet Imaging System
Tripod
Eye protection

8.2.4 PROCEDURE:

8.2.4.1 Attach the KSI to a tripod or use it as a hand held device.

8.2.4.2 Position the sliding filter system assembly to the UV position window (mirror facing away from analyst and the catalogue number facing the analyst).

8.2.4.3 Turn the KSI unit on and verify the red light is lit.

8.2.4.4 Turn on the ultraviolet light source. If using both 6-watt bulbs on the UV source, turn one bulb on at a time or both bulbs of the unit will only illuminate at half-power.

8.2.4.5 For best results, direct the UV light at a 15° to 45° angle from the surface of interest. Point the KSI perpendicular to the surface.

8.2.4.6 Set the aperture to the f/3.5 position (completely open).

8.2.4.7 Focus the 60mm lens.

8.2.4.8 Focus the eyepiece until you have the clearest largest picture.

8.2.4.9 When scanning an item or area for possible latent evidence the most effective distance for viewing is 0 –5 ft with the 12 watt UV light source and 5-10 ft with the 30 watt UV light source. The operator of the lamp and all others present should remain behind the light source when it is turned on.

8.2.4.10 If a latent impression is located, mark the location using the marking devices supplied or an adhesive scale. Always use a UV scale to insure proper sizing when photographing images with the KSI.

8.2.4.11 Use the Canon Power Shot G3 or other appropriate digital camera to capture KSI images.

8.2.4.12 After locating a latent print, attach the KSI unit to the copy stand or a tripod.

8.2.4.13 Focus using the short-wave UV light. Make sure that the KSI aperture is all the way open (f/3.5) and leave the KSI eyepiece in.

8.2.4.14 Attach the digital camera using the adapter.

8.2.4.15 Turn the camera on, ensure it is set to auto, turn on the MACRO setting, turn off the flash, and set to highest resolution possible.

8.2.4.16 Press the shutter button half way to activate the auto focus.

8.2.4.17 Use the zoom function to fill the viewing field with the latent image.

8.2.4.18 Capture the image by fully pressing the shutter button. It is preferable to use the remote to avoid shaking the camera.

8.2.4.19 Once the examination is complete, turn all equipment off, and store appropriately.

8.2.5 ADDITIONAL INFORMATION:

8.2.5.1 Refer to the digital camera manufacture's operator manual for full camera operation.

8.2.5.2 General maintenance consists of periodic laser pointer battery replacement, cleaning the surface of the KSI band pass filer with a lens cleaning solution and tissue, and cleaning the short-wave UV lamps and KSI UV lens with an alcohol moistened soft cloth. General maintenance shall be performed as needed.

8.2.5.3 UV lamps should be replaced as needed, taking care to dispose of lamps in a proper environmental manner as they contain mercury.

8.2.5.4 If the KSI malfunctions, it will be taken out of service until it can be repaired. The KSI shall be tagged indicating that it is out of service. Maintenance, service, etc. will be recorded in the maintenance log.

8.2.5.5 No calibration is required of this unit.

8.2.5.6 The manufacturer's operator manuals for this equipment shall be read prior to using the equipment.

8.2.6 CONTROLS:

8.2.6.1 Testing of the KSI is performed prior to each use.

8.2.6.2 This test involves the making of a quality latent print on a non-porous surface similar to the evidence being examined, if possible.

8.2.6.3 The test print is viewed with the KSI as outlined in the procedure.

8.2.6.4 An analyst shall not proceed with the processing of the evidence until a control test bearing positive results (visualization of a green colored print) has been carried out and documented in the laboratory case notes.

8.2.6.5 The area surrounding the intentionally deposited latent print shall serve as a negative control.

8.2.7 SAFETY:

8.2.7.1 Serious eye and skin injury along with allergic reactions may result if personnel are inadequately protected from the lamp or other improper use of the equipment occurs.

8.2.7.2 Exposure to UV-C and UV-B present great risk to the cornea. The short-wave UV-C light used with the KSI operates at 254 nm. Short-term injury may include keratoconjunctivitis (snow blindness or welders flash, a condition where the corneal epithelial cells are damaged or destroyed) and severe sunburn-like symptoms. Chronic (repeated) exposure is known to cause premature aging of the skin and skin cancers.

8.2.7.3 Never operate the UV lamps without wearing protective eyewear. Failure to do so may result in severe burns, long-term injury to the eyes, or blindness. Avoid needless exposure. UV light, although invisible, reflects in a manner similar to visible light. Turn lamps off when not in use.

8.2.7.4 All persons present should utilize protective measures including, UV absorbing face shields or glasses, long sleeved shirts, and gloves when the lamps are in use. These measures may not eliminate all UV radiation, but they will lessen the risk of severe exposure.

8.2.7.5 Some individuals are abnormally sensitive to UV radiation. If you believe yourself to be particularly sensitive to sunlight, do not work in an area where short-wave UV light is in use. Certain common medications and cosmetics may greatly increase your sensitivity to UV radiation. Consult your physician concerning any medication you may be taking.

8.2.7.6 Use extra caution when new lamps are installed as radiation levels may be markedly higher.

8.2.8 REFERENCES:

"Detecting and Enhancing Latent Fingerprints with Short Wave UV Reflection Photography," Wang Gui Qiang. Proceedings of the International Symposium on Fingerprint Detection and Identification, Israel National Police, 1991 pgs. 37-49.

"Evaluation of a Reflected Ultraviolet Imaging System for Fingerprint Detection," Richard Saferstein, and Susan L. Graf. *Journal of Forensic Identification*, 51 (4), 2001 pgs. 385-393.

Krimesite Imager User's Manual, Sirchie Finger Print Laboratories, Inc.

"Krimesite Training Notes," Instructor: Chris Harris, Sales and Training Representative, Sirchie Fingerprint Laboratories, Inc.

"Reflected Ultraviolet Imaging System Applications," Edward R. German. Proceedings of the International Symposium on Fingerprint Detection and Identification, Israel National Police, 1996 pgs. 115-118.

"UV Detection of Untreated Latent Fingerprints," Hadrian Fraval, Alex Bennett, and Eliot Springer. Proceedings of the International Symposium on Fingerprint Detection and Identification, Israel National Police, 1996 pgs. 51-58.

9 PHYSICAL METHODS

9.1 FLAME METHOD

9.1.1 BACKGROUND:

Some hard, smooth surfaces, especially galvanized metal, present problems for the latent analyst in the detection of latent print deposits. The latent prints dry out and resist the adhesion of cyanoacrylate esters and/or powders. The use of a dense smoke, such as that produced by the combustion of camphor or masking tape, provides heat that softens the latent print deposit. The particulates in the smoke bond with the deposit and color the ridge detail so that the latent print can be visualized.

9.1.2 SCOPE:

9.1.2.1 The flame method may be used to develop latent prints on substrates such as copper and galvanized metal where standard methods may not work as well.

9.1.2.2 The flame method may be used after cyanoacrylate and standard fingerprint powders have been used.

9.1.2.3 Surfaces that need other forensic examinations such as biology or trace examinations should be carefully evaluated prior to processing to determine if the flame method will have an impact on subsequent examinations.

9.1.3 EQUIPMENT AND MATERIALS:

Shallow metal or glass container
Matches
Fingerprint brushes

9.1.4 REAGENTS:

Camphor blocks
Masking tape

9.1.5 PROCEDURE:

9.1.5.1 Place a block of camphor or coiled strip of masking tape in a metal or glass container.

9.1.5.2 Ignite one edge of the camphor or the tape.

9.1.5.3 The combustion produces a dense black smoke.

9.1.5.4 The surface to be processed is passed through the column of smoke until the surface is coated with a thin layer of soot particles. The analyst should ensure that the surface does not get too hot, as this may cause damage to the item being examined. Care must also be taken to ensure that the layer of soot does not become too heavy as the ridge detail may be destroyed or obscured.

9.1.5.5 Extinguish the camphor or masking tape.

9.1.5.6 Brush the soot-coated surface with a fiberglass brush to expose the developed latent prints.

9.1.5.7 Developed prints are evaluated to determine their suitability for comparison.

9.1.5.8 Prints deemed to be of value are marked, photographed, and/or lifted at the discretion of the analyst.

9.1.6 ADDITIONAL INFORMATION:

9.1.6.1 Surfaces processed with this method may be damaged if too much heat is applied to the surface.

9.1.6.2 The process is dirty due to the dense oily smoke produced by combustion.

9.1.6.3 Shelf life of camphor is indefinite when stored in a cool dry place.

9.1.6.4 Collect camphor for disposal with hazardous waste. Masking tape may be disposed of in the trash.

9.1.7 CONTROLS:

9.1.7.1 Testing of the flame method is performed prior to each use.

9.1.7.2 This test involves the making of a quality latent print on a surface similar to the evidence being examined (if possible) and following the processing procedure.

9.1.7.3 An analyst cannot proceed with the processing of the evidence until a control test bearing positive results (development of a black print) has been carried out and documented in the laboratory case notes.

9.1.7.4 The area surrounding the intentionally deposited latent print shall serve as a negative control.

9.1.8 SAFETY:

9.1.8.1 Safety is a concern because of the open flame required for use. Ensure that no flammable solvents are in the vicinity.

9.1.8.2 This method should be performed in a fume hood or in a well-ventilated area to avoid contamination of the air with smoke and accidentally setting off the fire alarm.

9.1.9 REFERENCES:

Friction Ridge Skin, James F. Cowger, (1983), page 102.

Scott's Fingerprint Mechanics, Robert D. Olsen, (1971), pages 260-263

Fingerprint Techniques, Andre A. Moenssens, (1971), pages 126-127

9.2 IODINE FUMING

9.2.1 BACKGROUND:

Iodine fuming is one of the oldest latent print methods currently employed in the examination processes for the visualization of latent prints. Iodine vapors are physically absorbed by fats and oils of a latent print deposit and turn the latent print a yellow/brown color.

9.2.2 SCOPE:

9.2.2.1 Iodine is non-destructive and can be used on porous and non-porous surfaces.

9.2.2.2 Use when attempting to develop prints that are thought to be recently deposited and/or composed of fatty or oily residue. Iodine reacts to recently deposited prints better than old ones because the fats tend to become less receptive to this process with time.

9.2.2.3 Other latent print methods such as DFO or ninhydrin tend to dissolve the fats that the iodine reacts with. Therefore, if iodine fuming is to be used, it must be used prior to other latent print development processes.

9.2.2.4 Iodine is not suitable for metals or dark surfaces.

9.2.3 EQUIPMENT AND MATERIALS:

Fume hood
Chamber or a heavy-duty sealable plastic bag
Iodine fuming "gun"

9.2.4 REAGENT:

Iodine crystals

9.2.5 PROCEDURE 1 - CHAMBER METHOD:

9.2.5.1 In a fume hood, break open a glass ampoule of iodine crystals to reveal the iodine crystals.

9.2.5.2 Place the crystals in an airtight chamber (ex. sealable heavy plastic bag, commercial fuming chamber, etc.).

9.2.5.3 Apply heat if necessary. The application of heat may be accomplished in various ways including transfer of body heat, contained hot water, or an electric heater. Iodine crystals will start to sublimate, go from a solid to a gas, resulting in purplish fumes with the application of heat (approximately 100° F).

9.2.5.4 Place the control test and the questioned surface in the chamber and proceed with fuming.

9.2.5.5 The control test and evidence are monitored by viewing through the chamber to determine when processing is complete.

9.2.5.5.1 Latent prints, if developed, will turn a yellow-brown color.

9.2.5.5.2 The process needs to be carefully monitored so that over-development does not occur.

9.2.5.6 Developed prints are evaluated to determine their suitability for comparison.

9.2.5.7 Prints deemed to be of value are marked and photographed as soon as possible, and notes are taken.

9.2.6 PROCEDURE 2 - GUN METHOD:

9.2.6.1 Alternatively, the surface may be processed by using a commercially available fuming gun. The fuming "gun" consists of a length of rubber tubing (that acts as a mouthpiece) with a length of plastic tubing (about 6") attached. The plastic tubing contains an ampoule of iodine crystals, glass wool, and calcium chloride crystals to absorb the moisture that is introduced into the tube when the apparatus is blown into.

9.2.6.2 This method shall be performed in a fume hood or an area with generous ventilation (ex. outdoors).

9.2.6.3 The "gun" is used by breaking the ampoule open to reveal the iodine crystals and wrapping one's hand around the tube. The warmth from the hand is sufficient to cause the iodine to sublimate. The formation of purple fumes is indicative of iodine vapors.

9.2.6.4 When fumes are noticed, the mouthpiece is blown into, and the fumes are directed onto the substrate.

9.2.6.4.1 Latent prints, if developed, will turn a yellow-brown color.

9.2.6.4.2 The process needs to be carefully monitored so that over-development does not occur.

9.2.6.5 Developed prints are evaluated to determine their suitability for comparison.

9.2.6.6 Prints deemed to be of value are marked and photographed as soon as possible, and notes are taken.

9.2.7 ADDITIONAL INFORMATION:

9.2.7.1 The resulting yellow-brown latent prints can vanish and must be preserved.

9.2.7.2 It is suggested that the camera be set up prior to iodine processing.

9.2.7.3 Iodine prints that have faded, or are completely gone, can sometimes be redeveloped by reprocessing. Iodine reprocessing cannot be done if other methods have been used or if too long of a time span has elapsed.

9.2.7.4 Shelf life of sealed iodine is indefinite.

9.2.7.5 Iodine crystals originating from glass ampoules shall be disposed of in the hazardous waste containers located in the fume hoods. Excess tubing shall be removed from the fuming guns (thrown

away) and the remainder (portion containing iodine) shall be placed in the hazardous wastes containers located in the fume hood.

9.2.8 CONTROLS:

9.2.8.1 Testing of iodine crystals is performed prior to each use.

9.2.8.2 This test involves the making of a quality latent print (oil based) on a test surface similar to the evidence being examined.

9.2.8.3 The test print is exposed to the fumes in the same manner as the questioned surface would be.

9.2.8.4 When using the chamber method, testing of the iodine crystals and processing may be conducted at the same time. When using the fuming gun, an analyst shall not proceed with the processing of the evidence until a control test bearing positive results (development of a yellow-brown print) has been carried out and documented in the laboratory case notes and on the control tests work sheet.

9.2.8.5 The area surrounding the intentionally deposited latent print shall serve as a negative control.

9.2.9 SAFETY:

9.2.9.1 Safety is a serious concern when using the iodine fuming method. *Iodine is toxic in any form. ALWAYS AVOID INHALING IODINE FUMES AND NEVER BREATHE IN WHEN USING THE FUMING "GUN" APPARATUS!!*

9.2.9.2 Iodine fumes may irritate the skin and damage the respiratory tract. Headaches that can last for several days may result from exposure to iodine. Long-term effects to the thyroid gland may result from exposure.

9.2.9.3 Adequate ventilation when using the method is mandatory as the fumes are corrosive to metals and may discolor other surfaces that they come in contact with.

9.2.9.4 Iodine shall be purchased in disposable fuming guns or glass ampoules. The ampoules shall stay sealed until use.

9.2.10 REFERENCES:

Friction Ridge Skin, James F. Cowger, (1983), pages 93-96.

Fingerprint Techniques, Andre A. Moenssens, (1971), pages 114-120.

Scott's Fingerprint Mechanics, Robert D. Olsen, (1978), pages 247-256.

Manual of Fingerprint Development Techniques, British Home Office, (1998), Chapter 4. Peavey Product Guide, (1999).

9.3 LIFTING METHODS

9.3.1 BACKGROUND:

Lifting methods are effective for the preservation of latent print impressions because the adhesive on the lifting medium is stickier than the surface on which the latent print deposit resides. It is a good idea to have a variety of lifting mediums as they vary in clarity, adhesion, and flexibility.

9.3.2 SCOPE:

9.3.2.1 Lifting methods are applicable to prints that have first been developed utilizing other methods such as powders, SPR, flame processing, and occasionally prints deposited in dust.

9.3.2.2 Lifts are inexpensive, easy, and a quick method of preserving developed latent images for future comparison.

9.3.2.3 Latent print lifting is one of the most common and effective methods of preserving latent print images at a crime scene.

9.3.2.4 Lifting may not be the most effective method of preserving a particular latent print.

9.3.3 EQUIPMENTAND MATERIALS:

Powder station exhaust vent or hood
Various sizes and types of standard lifting tapes
Hinge lifts
Elastic tapes
Gel lifters
Casting compounds

9.3.4 PROCEDURE 1 - HINGE LIFTS, TAPES, AND GEL LIFTERS:

9.3.4.1 Ensure that the surface has been prepared for lifting by removing excess powder.

9.3.4.2 Lifting mediums should be removed from their backing in a smooth, continuous motion without hesitation to avoid lines in the adhesive.

9.3.4.3 The lifting medium is then applied to the latent bearing surface in a smooth continuous motion taking care to avoid air pockets and creases. It may be necessary to firmly rub the lifting medium onto the surface using a fair amount of pressure.

9.3.4.4 Removal of the lifting medium from the latent bearing surface should also be performed in a smooth continuous motion and reapplied to the glossy side of the latent lift card in the same manner as noted above.

9.3.4.5 Latent lift cards shall be filled out as completely as possible and shall include the following:
Unique case identifier;
Date and initials;

Impression source (description or source identifier);
Significant information about the orientation and/or position of the latent print on the object through description and/or diagram(s). One should be able to pinpoint the area and orientation of a latent print on the object.

9.3.4.6 Lifts from multiple areas (different latents) shall be placed on individual cards.

9.3.4.7 Multiple lifts of the same latent may be placed on the same card.

9.3.5 PROCEDURE 2 - CASTING COMPOUNDS:

9.3.5.1 Ensure that the surface has been prepared for lifting by removing excess powder.

9.3.5.2 Casting material is mixed either by hand or though the use of an extruder gun.

9.3.5.3 Casting material is applied to the latent bearing surface in a manner that precludes air pockets. It may be necessary to place the casting material to the side of the latent and then smooth it across the surface.

9.3.5.4 The casting material is left in place until solidified.

9.3.5.5 It then is removed from the surface and attached to a latent lift card. The appropriate documentation is noted as detailed in 9.3.4.5.

9.3.6 ADDITIONAL INFORMATION:

9.3.6.1 Caution should be exercised in using general-purpose tapes (those not developed for lifting latents) as they may cause migration of some latent print ridge detail or may have striations or other imperfections making it hard to do comparisons.

9.3.6.2 Lifting should be performed after any necessary photography. The analyst's training and experience will determine the use and/or sequence of the lifting and photographic processes.

9.3.6.3 Store lifting mediums and casting compounds in a cool dry place.

9.3.6.4 Dispose of lifting mediums and casting compounds in the trash.

9.3.7 CONTROLS:
Not applicable

9.3.8 SAFETY:
There are no known health hazards associated with the use of lifting mediums or casting compounds.

9.3.9 REFERENCES:
Scott's Fingerprint Mechanics, Robert D. Olsen, (1978). Pages 369-387.

Fingerprint Techniques, Andre, A. Moenssens, (1971). Pages 109-112.

Friction Ridge Skin, James F. Cowger, (1983). Pages 85-88.

Manual of Fingerprint Development Techniques Home Office Police Scientific Development Branch (1998).

9.4 POWDER DETECTION METHODS

9.4.1 BACKGROUND:

Many commercially produced latent print powders are available and no powder is universally applicable to all types of non-porous surfaces. Most analysts stock a variety of different types and colors of powders as well as a variety of brushes for specialized applications. Powder particles physically adhere to latent print residue allowing the latent print to be visualized. This coloring of the friction ridge residue occurs because the residue has greater adhesion properties than the substrate.

9.4.2 SCOPE:

9.4.2.1 Latent print powders are used to develop invisible ridge detail, improve contrast of visible ridge detail, and to facilitate lifting and preservation of fingerprint evidence from non-porous surfaces.

9.4.2.2 The type of powder that is selected is dependent upon:

9.4.2.2.1 Whether resulting latents will be photographed. If so, a powder color that contrasts with the surface is often desirable.

9.4.2.2.2 The nature of the surface to be processed. Traditional powders are often most effective on non-textured surfaces while magnetic powders are often most effective on plastics and textured surfaces. The use of magnetic powders and wands should generally be avoided on substrates that contain iron. Fluorescent powders tend to have limited use. They are useful on multicolored surfaces or surfaces with a light texture that doesn't accept magnetic powder well.

9.4.2.3 The type of applicator selected is dependent upon:

9.4.2.3.1 The size of area to be dusted. Larger brushes are ordinarily used for large areas and smaller brushes on concentrated work or individual latent prints. Fiberglass brushes are often used for both instances.

9.4.2.3.2 The type of powder to be used. Magnetic wands are used in conjunction with magnetic powders while traditional powders are used with a variety of brushes. Traditional fluorescent powders are applied with a feather brush and their application requires the use of an ALS.

9.4.2.4 The prior use of cyanoacrylate esters often increases the adhesion of powders to latent print residue.

9.4.2.5 Powder processing is not suitable for surfaces that are wet, tacky, or exceptionally rough and is generally the last step in the latent print processing sequence.

9.4.3 EQUIPMENTAND MATERIALS:
Hood/exhaust vents/particulate filters
Traditional, magnetic, and fluorescent powders
Magnetic wand, feather brush, fiberglass brush, animal hair, etc.
Alternate light source
Filtered goggles

9.4.4 PROCEDURE 1 - TRADITIONAL POWDERS:

9.4.4.1 A variety of brushes or applicators may be utilized with the exception of magnetic wands.

9.4.4.2 Apply a small amount of powder to the brush and remove excess powder.

9.4.4.3 Powder should generally be applied to the surface in a smooth circular motion with only the tips of the brush touching the surface. Once the direction of ridge flow can be established, powdering should proceed by following the ridge flow until optimal development is achieved.

9.4.4.4 The adherence of powder to a latent print may be enhanced by utilizing the "huffing technique." Gently breathing on the surface while dusting for latent prints sometimes adds moisture to the latent print residue, thus enabling the powder to adhere more effectively. All visible moisture should be evaporated prior to powder application.

9.4.4.5 If too much powder has been applied, it may be possible to remove excess powder by tapping the object, blowing air over the surface, or by brushing it out.

9.4.4.6 Developed prints are evaluated to determine their suitability for comparison.

9.4.4.7 Prints deemed to be of value are marked and may be photographed or lifted.

9.4.5 PROCEDURE 2 - MAGNETIC POWDERS:

9.4.5.1 Magnetic powders generally utilize a magnetic wand in their application.

9.4.5.2 The wand is dipped into the magnetic powder where the powder is picked up by the tip of the wand. The powder actually forms a bristle-less brush that is then applied directly to the surface. The actual wand should not come in contact with the surface.

9.4.5.3 The application of magnetic powders is similar to the dusting method described in 9.4.4.3 & 9.4.4.4.

9.4.5.4 The plunger located at the end of the brush is pulled to its fully extended position to release the powder from the tip of the brush.

9.4.5.5 Excess powder may be removed by passing a wand over the surface without making contact.

9.4.5.6 Developed prints are evaluated to determine their suitability for comparison.

9.4.5.7 Prints deemed to be of value are marked and may be photographed or lifted.

9.4.6 PROCEDURE 3 - FLUORESCENT POWDERS:

9.4.6.1 A variety of brushes or applicators may be utilized.

9.4.6.2 Lightly dip the brush into the powder. Remove excess powder. A very small amount of fluorescent powder goes a long way.

9.4.6.3 If possible, it is best to use an ALS while applying the powder. This will prevent over powdering and loss of ridge detail. The application of fluorescent powders is similar to the dusting methods described in 9.4.4.3 & 9.4.4.4.

9.4.6.4 Developed prints are evaluated to determine their suitability for comparison.

9.4.6.5 Prints deemed to be of value are marked and may be photographed or lifted. When photographing latents developed with fluorescent powders, it is necessary to use an ALS and a camera filter that corresponds to the color of viewing goggle utilized with the ALS. It is necessary to use black latent lift cards with fluorescent powders.

9.4.7 ADDITIONAL INFORMATION:

9.4.7.1 Occasionally, latent quality may be enhanced by repeated powdering and lifting of the same area.

9.4.7.2 An ample number of appropriate brushes will help preclude cross-contamination of powders and brushes.

9.4.7.3 When powder-processing evidence known to be biologically contaminated, every effort shall be made to avoid cross contamination by utilizing previously unused brushes and powder. Brushes and powder will be discarded after use on contaminated items. Magnetic wands will be disinfected.

9.4.7.4 Powders stored in a cool dry place have an indefinite shelf life.

9.4.7.5 Dispose of powders in the trash.

9.4.8 CONTROLS:

Test impressions are generally not applicable. However, when there is doubt as to the suitability of a powder for processing a particular surface a test impression should be made on a similar surface if available. If a similar surface is not available, then an area of the suspected surface may be explored "blindly" (i.e. wiped clean and used for testing). This test impression shall be destroyed immediately after it has served its purpose.

9.4.9 SAFETY:

9.4.9.1 Safety concerns when using commercial fingerprint powders are minimal.

9.4.9.2 Analysts are required to use the hoods or exhaust vents positioned at each workstation when performing powdering and lifting in the laboratory.

9.4.9.3 When fingerprint powders are to be used for an extended period of time, a dust mask or half face respirator with dust filters should be worn to minimize the inhalation of the powder particles.

9.4.9.4 Persons using fingerprint powders should monitor reactions (if any) to the fingerprint powders.

9.4.10 REFERENCES:

Scott's Fingerprint Mechanics, Robert D. Olsen, (1978), pages 209-235.

Fingerprint Techniques, Andre A. Moenssens, (1971), pages 106-109 and 112-114.

Friction Ridge Skin, James F. Cowger, (1983), pages 85-88.

Manual of Fingerprint Development Techniques Home Office Police Scientific Development Branch (1998).

9.5 SMALL PARTICLE REAGENT

9.5.1 BACKGROUND:

Two types of small particle reagents (SPR) are available for use, traditional SPR which consists of a suspension of fine molybdenum disulfide (MoS_2) particles in a detergent solution and commercially available white SPR. These solutions works like a liquid fingerprint powder by adhering to the fatty portion of the latent print residue resulting in a gray or white colored latent.

9.5.2 SCOPE:

9.5.2.1 Small particle reagent is used to develop latent prints from a variety of surfaces including adhesives and non-porous items that are or have been wet.

9.5.2.2 The color of SPR should be chosen to contrast with the background.

9.5.2.3 SPR may be used by dipping or spraying. Dipping is the preferred method as spraying is less sensitive. It is, however, difficult to prevent damage to fingerprints located on the lower side of an article in a dish and spraying is a valid alternative when processing large items, vehicles, or responding to crime scenes.

9.5.2.4 Surfaces that need other forensic examinations such as biology, questioned document, or trace examinations should be carefully evaluated prior to processing to determine if the SPR procedure will have an impact on subsequent examinations.

9.5.3 EQUIPMENT AND MATERIALS:

Beaker
Balance
Magnetic stirrer/stirring bar
Spray bottles
Processing tray

9.5.4 REAGENTS:

Commercially available white SPR
Molybdenum Disulfide (MoS_2)
Photo Flo 200
Distilled water

Small Particle Reagent Working Solution:

1. Place a 1500 ml beaker on magnetic stirrer base.
2. Add 1000 ml of distilled water to the beaker.
3. Place a magnetic stirring bar in the beaker.
4. Dissolve 30g of MoS_2 in the water (MoS_2 comes in 30g bottles).
5. Add three to four drops of Photo Flo 200 to the solution.

9.5.5 PROCEDURE 1 - DIPPING METHOD:

9.5.5.1 Shake or stir the SPR thoroughly and pour the solution into a tray.

9.5.5.2 Add the item to be processed to the solution. The item should be submerged.

9.5.5.3 Agitate the solution in the tray for 2-3 minutes, remove the item from the SPR and gently rinse with tap water.

9.5.5.4 Allow the surface to dry (if feasible).

9.5.5.5 Developed prints are evaluated to determine their suitability for comparison.

9.5.5.6 Prints deemed to be of value are marked and may be photographed or lifted. Depending on the circumstances, the item may or may not be dried prior to lifting.

9.5.6 PROCEDURE 2 - SPRAY METHOD:

9.5.6.1 Place the SPR into a spray bottle and shake thoroughly. The bottle should be shaken often to keep the MoS_2 in suspension.

9.5.6.2 Spray the SPR onto the item being examined. If the location of the latent prints are known, spray the area above the prints and allow the SPR to flow over the prints. Otherwise, spray the area to be examined starting at the top and working downwards.

9.5.6.3 Gently rinse the processed area with tap water and allow it to dry (if feasible).

9.5.6.4 Developed prints are evaluated to determine their suitability for comparison.

9.5.6.5 Prints deemed to be of value are marked and may be photographed or lifted. Depending on the circumstances, the item may or may not be dried prior to lifting.

9.5.7 ADDITIONAL INFORMATION:

9.5.7.1 Pre-mixed molybdenum has an indefinite shelf life. The shelf life the SPR working solutions is at least six months, but shall be tested prior to each use.

9.5.7.2 Excess reagent shall be collected and placed in the hazardous waste container located in the fume hood.

9.5.8 CONTROLS:

9.5.8.1 Testing of SPR is performed each day prior to use.

9.5.8.2 This test involves the making of quality latent prints on a test surface similar to the one being examined.

9.5.8.3 The test print is exposed to the SPR in the same manner as the questioned surface.

9.5.8.4 An analyst shall not proceed with the processing of the evidence until a control test bearing positive results (development of a gray colored latent with traditional SPR or a white colored latent

with white SPR) has been carried out and documented in the laboratory case notes and on the control tests work sheet.

9.5.8.5 The area surrounding the intentionally deposited latent print shall serve as a negative control.

9.5.9 SAFETY:

There does not appear to be any health hazards associated with small particle reagent, but the process should be monitored to see if there are any allergies. Lab coats, gloves, and safety glasses should be worn.

9.5.10 REFERENCES:

Manual of Fingerprint Development Techniques, British Home Office, (1998), chapter 4.

Advances in Fingerprint Technology, Henry C. Lee and R.E. Gaensslen, (1991), pages 82-83.

Technical Notes #1-2757, Lightning Powder Co.

9.6 STICKY-SIDE POWDER

9.6.1 BACKGROUND:

Processing adhesives on the sticky sides of tape and other items, such as labels, presents problems in processing. Traditional powders will not work (unless modified) because the adhesive properties cause the powder to obscure latent print deposits. Sticky-side powder is a liquid fingerprint detection method that produces gray-black developed latent prints when applied to adhesive surfaces. Sticky-side powder detects the fatty/oily and/or epithelial cells often left when handling adhesive surfaces.

9.6.2 SCOPE:

9.6.2.1 Sticky-side powder is used to process adhesives. Due to the color of the resulting latent print, sticky-side powder may be more appropriate for certain types of tapes than for others (ex. masking tape vs. electrical tape).

9.6.2.2 When the item to be processed contains both an adhesive side and a non-porous side, the non-porous side should be processed prior to the application of sticky-side powder.

9.6.2.3 Sticky-side powder can be used in two ways, the powder solution can be painted on, or the surface can be immersed in an aqueous solution containing the powder solution.

9.6.2.4 Surfaces that require other forensic examinations, such as trace or biology, should be carefully evaluated prior to processing to determine if this procedure will have an impact on subsequent examinations.

9.6.3 EQUIPMENT AND MATERIALS:

Small glass beaker
Stir rod
Soft brush (animal hair, paint brush, etc.)
Glass tray

9.6.4 REAGENTS:

Sticky-Side powder
Photo-Flo
Black Powder
Liqui-Nox detergent or equivalent
Tap or distilled water

Sticky-Side Powder Working Solution:

1. Mix a solution of water and Photo-Flo in a glass beaker in a 1:1 ratio.
2. Mix approximately equal amounts of sticky-side powder into the Photo-Flo solution to make a liquid that has the consistency of paint. Mix a volume suitable for the application at hand.

Sticky-Side Powder Equivalent Working Solution:

1. Measure out 0.5g of traditional black fingerprint powder and place in a glass beaker.
2. Add 1 ml of water.
3. Add 1 ml of Liqui-Nox or other equivalent detergent.
4. Thoroughly mix the liquid and fingerprint powder.

9.6.5 PROCEDURE:

9.6.5.1 The reagent is painted onto the adhesive surface with soft brush or the item may be submersed in the solution. When using the submersion method, ensure that the adhesive side is up as some agitation may be necessary.

9.6.5.2 Allow the reagent to remain on the surface for 10 to 20 seconds.

9.6.5.3 Rinse with water.

9.6.5.4 Examine the adhesive surface for latent prints. The surface may be reprocessed to improve contrast and/or make the latent print(s) darker.

9.6.5.5 Allow the surface to dry thoroughly.

9.6.5.6 Any suitable latent prints are marked and photographed or covered with a protective cover such as lifting tape or clear plastic.

9.6.6 ADDITIONAL INFORMATION:

9.6.6.1 Pre-mixed sticky-side powder has an indefinite shelf life. The working solution shall be mixed prior to each use.

9.6.6.2 Working solution may be rinsed down the drain or disposed of in the trash.

9.6.7 CONTROLS:

9.6.7.1 Testing of sticky-side powder is performed each day prior to use.

9.6.7.2 This test involves the making of a quality latent print on a test surface similar to the evidence being examined and following the processing procedure.

9.6.7.3 An analyst cannot proceed with the processing of the evidence until a control test bearing positive results (development of a gray-black print) has been carried out and documented in the laboratory case notes.

9.6.7.4 The area surrounding the intentionally deposited latent print shall serve as a negative control.

9.6.8 SAFETY:

When using sticky-side powder in the previously described manner, there does not appear to be a significant health hazard. When using the powder in the dry form, precautions should be taken to prevent the powder from becoming airborne and possibly inhaled. Small amounts of

sticky-side powder can be safely washed down the drain, while larger amounts should be collected in a suitable container for disposal.

9.6.9 REFERENCES:

Journal of Forensic Sciences, Vol. 44, No. 2, "Sticky-Side Powder: The Japanese Solution", Darren S. Burns, pages 133-138.

"Sticky-Side Powder", Technical Note, Lightning Powder Co., (April, 1994).

9.7 TAKING KNOWN EXEMPLARS (REFERENCE STANDARDS)

9.7.1 BACKGROUND:

Known exemplars (reference standards) is a term used to describe friction ridge impressions that are purposely made. These impressions may be made using a number of techniques, including, but not limited to, traditional ink, live scan, and powder/adhesive lift methods. The goal of the process is to produce legible impressions that are suitable for classification and/or comparison.

9.7.2 SCOPE:

9.7.2.1 The following techniques are used when analysts are called upon to take fingerprints of living and/or deceased persons. It is up to the analyst's discretion to determine the appropriate methods for the given circumstances.

9.7.2.2 The section on post-mortem fingerprinting does not signify that the procedures be mandated to the extent that it precludes the use of variations of the procedures or different procedures for recording impressions. Each case is unique as to its requirements and it is up to the analyst to determine the procedure appropriate for the given circumstances. The printer's task is to obtain usable prints; any reasonable technique that accomplishes this is acceptable.

9.7.3 EQUIPMENT AND MATERIALS:

Black printers ink
Brayer & inking plate
Porelon pad
Black fingerprint powder
Fiberglass brush
Identification cards
Adhesive lifts
Needle and syringe
Fingerprinting spoon
Protective apparel

9.7.4 REAGENTS:

Post-mortem injection solution (tissue builder, water, air etc.)

9.7.5 PROCEDURE 1 - KNOWN EXEMPLARS:

9.7.5.1 Insure that the area to be printed is dry and free of debris.

9.7.5.2 Inked Fingerprints

9.7.5.2.1 Place the fingerprint card in the cardholder.

9.7.5.2.2 Beginning with the right thumb, roll the thumb from nail-bed to nail-bed on an inking plate or Porelon pad. Roll the thumb in the same manor on the fingerprint

card in the space marked "1. R. Thumb." Roll the thumb with even pressure to avoid smearing.

9.7.5.2.3 Continue this procedure for each finger ensuring the prints are placed in the corresponding box on the fingerprint card.

9.7.5.2.4 If a mistake is made, the analyst may affix an adhesive tab over the error and roll a new print or destroy the card.

9.7.5.2.5 Ink the right and left thumbs and place a plain impression in the corresponding box at the bottom of the fingerprint card. Repeat the procedure with the right and left four fingers simultaneously placing plain impressions in the corresponding boxes at the bottom of the fingerprint card.

9.7.5.2.6 If an amputation, deformity, or injury makes it impossible to print a finger, make a notation to that effect in the individual finger block.

9.7.5.3 Inked Palm Prints

9.7.5.3.1 Place a piece of white paper or palm print card around a cylindrical object (piece of pipe, cardboard tube etc.).

9.7.5.3.2 Using a brayer, apply a thin coat of ink to the palmer friction ridges from the wrist to the tips of the fingers.

9.7.5.3.3 Place the wrist of the inked palm on the paper and roll the cylinder back toward the subject while applying pressure to the palm. This method will produce quality ridge detail for the entire palmar surface, even hard to capture areas such as the medial and proximal phalanges and the center portion of the palm.

9.7.5.3.4 Individually ink and roll the thenar and hypothenar portions of the palm using the inking plate. The sides of the hand are placed on the inking plate at an approximate 45° angle and partially rolled to ink the correct portion of the palm. The same motion is then repeated to transfer the ink to the palm print sheet. These impressions may be placed on the same sheet if there is adequate room.

9.7.5.3.5 Repeat the above procedure for the other hand.

9.7.5.4 Complete Friction Ridge Exemplars.

9.7.5.4.1 Complete friction ridge exemplars are often referred to as major case prints. They consist of recordings of all friction ridge skin on the palmer surface of the hands and on occasion, the plantar portion of the feet. A complete set of palmar major case prints includes a set of rolled fingerprints, palm prints, sides of palms, sides of fingers (full length), and finger tips.

9.7.5.4.2 These prints may be obtained through traditional inking methods or by using the black powder/adhesive lift method.

9.7.5.5 Black Powder/Adhesive Lift Method

9.7.5.5.1 Lightly powder the portion of friction ridge skin to be printed using a fiberglass brush and black powder.

9.7.5.5.2 Choose an adhesive lift of appropriate size and remove the backing.

9.7.5.5.3 Place the powder-processed skin onto the adhesive lift and ensure that it makes good contact.

9.7.5.5.4 Carefully remove the adhesive from the skin and smooth an acetate cover over the lift avoiding creases and air pockets.

9.7.5.6 All exemplars should be marked with the date, analyst's name, case number (if known) and subject's name (if known).

9.7.6 PROCEDURE 2 – POST-MORTEM EXEMPLARS:

9.7.6.1 Prints may be recovered from the deceased in the same manner as stated above. However, due to injury, decomposition or other circumstances, traditional methods may not yield satisfactory results.

9.7.6.2 Examine the remains to determine the appropriate method.

9.7.6.3 Clean the remains with a soft brush or cloth and warm water.

9.7.6.4 Dry the friction ridge areas to be printed.

9.7.6.5 Choose an appropriate post-mortem method. It is up to the analyst to determine the appropriate procedure for the given circumstances. The following are recommendations only:

9.7.6.5.1 Printing The Recently Deceased

9.7.6.5.1.1 If the body has been refrigerated, it is helpful to allow it to warm near room temperature prior to printing. This will reduce condensation that may interfere with the printing process.

9.7.6.5.1.2 If rigor mortis has set in, attempt to "break the rigor" by forcefully bending the joints back and forth.

9.7.6.5.1.3 If the fingers have begun to wrinkle due to decomposition or exposure, an attempt should be made to pull the skin tight while taking the impression.

9.7.6.5.1.4 If complete impressions still cannot be obtained, this condition may be corrected through the use of a post mortem injection solution.

9.7.6.5.1.4.1 Fill a syringe with a post mortem injection solution.

9.7.6.5.1.4.2 Insert the needle just below the skin at the distal joint of the finger and into the distal phalanx area. Inject the solution until the pattern is rounded out. Care should be taken to prevent the needle from puncturing the skin after the initial insertion. If necessary, a string may be tied just above the site to prevent the solution from leaking out.

9.7.6.5.1.5 Print the finger as outlined in one of the above methods.

9.7.6.5.2 Printing Badly Decomposed or Macerated Remains

9.7.6.5.2.1 In cases of advanced decomposition or extended periods of water immersion, it is common for the epidermal layer of skin to separate from the dermis.

9.7.6.5.2.2 Wash and dry the friction ridge skin.

9.7.6.5.2.3 Attempt to photograph and/or record with ink or powder methods.

9.7.6.5.2.4 If the separated friction ridge skin is too fragile to work with, it may be cleansed, flattened under a piece of glass, and photographed.

9.7.6.5.2.5 Occasionally, a large portion of the epidermis separates in the form of an "epidermal glove." If this occurs, the skin may be placed on the analyst's gloved hand and the impressions recorded in a traditional fashion. It may be necessary to excise the skin from the underlying tissue if it is still partially attached.

9.7.6.5.2.6 If the epidermal layer is no longer available, it may still be possible to obtain usable prints by photographing the dermis and/or using the black powder lift method.

9.7.6.5.3 Printing Mummified Remains

9.7.6.5.3.1 As the drying process occurs, friction ridge areas may become shrunken, hard, dry, and deeply creased making fingerprinting via traditional means impossible.

9.7.6.5.3.2 Depending on the circumstances, an analyst may attempt traditional ink and/or powder

lift methods, photography, casting, or re-hydration techniques.

9.7.6.5.3.2.1 See literature for re-hydration solutions.

9.7.6.5.3.2.2 If re-hydration is successful the tissue may be printed as outlined in one of the above methods.

9.7.6.5.4 Printing Burned Remains

9.7.6.5.4.1 Remove hardened and partially loosened skin by gently twisting.

9.7.6.5.4.2 Examine the underside of the skin for friction ridges.

9.7.6.5.4.3 Gently clean the skin using a soft brush and warm water.

9.7.6.5.4.4 Allow the skin to dry.

9.7.6.5.4.5 Photograph and/or attempt to ink, powder and lift, or cast.

9.7.6.6 Examine impressions as soon as they are obtained to ensure that adequate clear impressions have been obtained.

9.7.7 CONTROLS:
Not applicable

9.7.8 SAFETY:
All human tissue shall be treated as if infectious.

9.7.8.2 Gloves, eye protection, lab coat, and/or a protective disposable apron shall be worn at all times when working with any body parts.

9.7.8.3 Utensils shall be disposed of or cleaned and disinfected after use and surfaces will be disinfected.

9.7.9 REFERENCES:

Friction Ridge Skin, Comparison and Identification of Fingerprints, James F. Cowger, (1993) Chapter 2 *Taking Inked Prints*, pages 9-33,

The Science of Fingerprints, U.S. Department of Justice, F.B.I. Laboratory Division, (1984), pages 111-157.

Scotts Fingerprint Mechanics, Robert D. Olsen, SR (1977), pages 55-92.

10 CHEMICAL METHODS

10.1 AMIDO BLACK BLOOD PRINT PROCESSING

10.1.1 BACKGROUND:

Amido Black is also known as Amido Black 10B, Amido Black 12B, Napthol Blue Black, or Napthalene Black. Amido black is a dye that stains the protein portion of blood a blue-black color.

10.1.2 SCOPE:

10.1.2.1 Blood contaminated prints may be processed with amido black to detect faint deposits of friction ridge skin impressions. It is generally used on dried blood stains on non-porous surfaces, but has been successful in developing prints on some semi-porous and porous surfaces as well.

10.1.2.2 Amido black will not detect the normal constituents of latent prints and therefore must be used in the proper sequence with other latent processing methods.

10.1.2.3 The amido black process utilizes a working solution, a rinse solution, and a wash solution (distilled water). Blood must be fixed prior to the application of amido black (unless using methanol in the amido black working solution as a fixing agent) to prevent the liquid solutions used in the process from washing away some or all of the blood deposits.

10.1.2.4 Bloodstains must be carefully examined and evaluated to preclude destruction of potentially valuable evidence. Any samples to be used for the biological examination of blood deposits or trace analysis should be collected prior to enhancement. It is often necessary to coordinate with investigators and/or other laboratory sections (biology for example) to determine which procedures may provide the most valuable findings.

10.1.3 EQUIPMENT AND MATERIALS:

Balance, magnetic stirrer/stirring bar
Pipettes
Beakers
Graduated cylinder
Appropriately sized storage bottles
Squirt bottles

10.1.4 REAGENTS:

Amido Black
Glacial acetic acid
Methanol
Distilled water

Amido Black Working Solution:

1. Weigh out 3-5 grams of amido black and place in a clean, dry beaker.
2. Measure out 100 ml of acetic acid and add to the amido black.
3. Measure out 900 ml of methanol and add to the beaker containing the amido black and acetic acid.
4. Stir the solution with a magnetic stirrer for thirty minutes and transfer the solution to a clean storage bottle.

Amido Black Rinse Solution (de-stain):

1. Measure out 100 ml of acetic acid and pour into a clean, dry glass beaker.
2. Measure the 900 ml of methanol and add it to the beaker.
3. Stir the solution for two to three minutes and transfer the solution to a clean, dry storage bottle.

10.1.5 PROCEDURE:

10.1.5.1 Ensure that the evidence has a blood component by having presumptive blood testing performed.

10.1.5.2 Determine if samples for biology should be taken prior to processing.

10.1.5.3 Conduct control tests.

10.1.5.4 "Fix" impressions using heat, methanol, or super-glue. Blood can be fixed to an object by heating in a 100° centigrade oven for thirty minutes (restricted to non-heat sensitive objects). Methanol may be sprayed or pipetted over the item. The first amido black rise that contains methanol will suffice for this "fixing" rinse. Super-glue is an effective method for non-porous evidence as it will fix all possible latent prints not just those contaminated with blood.

10.1.5.5 Immerse the item in the amido black working solution for two to three minutes. Alternatively, the item may be sprayed or irrigated with the amido black working solution.

10.1.5.6 Immerse or irrigate the item with the de-stain rinse solution to remove the excess dye.

10.1.5.7 Resulting latent prints are a dark blue-black. The above process may be repeated to improve contrast.

10.1.5.8 Immerse or irrigate the surface with the distilled water wash (optional).

10.1.5.9 Allow the item to dry thoroughly.

10.1.5.10 Developed prints are evaluated to determine their suitability for comparison.

10.1.5.11 Prints deemed to be of value are marked and photographed.

10.1.6 ADDITIONAL INFORMATION:

10.1.6.1 Shelf life of the pre-mixed amido black, working solution, and de-stain is indefinite.

10.1.6.2 Excess reagent shall be collected, when possible, and placed in the hazardous waste container located in the fume hood.

10.1.7 CONTROLS:

10.1.7.1 Testing of amido black is performed each day prior to use.

10.1.7.2 Control tests are performed by the application of the reagent to a slide prepared with known blood. For safety reasons, analysts *will not* prepare friction ridge impressions made with blood. A smear will be applied to the slide instead.

10.1.7.3 An analyst shall not proceed with the processing of the evidence until a control test bearing positive results (known blood staining a blue-black color) has been carried out and documented in the laboratory case notes and on the control tests work sheet.

10.1.7.4 The area surrounding the intentionally deposited blood smear shall serve as a negative control.

10.1.8 SAFETY:

10.1.8.1 Gloves, lab coats, goggles, and respirators, (if there is a chance of the reagents becoming airborne) are worn when mixing or using Amido Black.

10.1.8.2 Glacial acetic acid is corrosive and extremely irritating to the eyes and respiratory system. Avoid breathing the vapors and use in a fume hood, with a respirator, or with adequate ventilation. Glacial Acetic Acid will cause burns if it comes in contact with skin.

10.1.8.3 Methanol is *flammable*. It needs to be handled carefully and non-permeable gloves worn during the mixing and use of Amido Black. Methanol is toxic in quantities as small as 30 ml and should not be allowed to come in contact with the skin, eyes, or mouth. It is possible for methanol to be absorbed through the skin. If methanol comes into contact with the eyes or mouth, the area should be flushed with generous amounts of water and a doctor may be consulted. Inhalation of methanol vapors should be kept at a minimum and the solution should be used in a well-ventilated area.

10.1.8.4 In addition, analysts must be aware of the biological hazards associated with blood and other body fluids and take extra precautions to protect themselves.

10.1.9 REFERENCES:

Manual of Fingerprint Development Techniques, British Home Office, (1998).

Journal of Forensic Identification, Vol. 45, No. 5 Sept/Oct 1995, "Superglue of Latent Shoe Prints in Blood Prior to Processing", pages 498-50.

Proceedings of the International Forensic Symposium on Latent Prints, "Enhance Latent Prints in Blood With New Staining Techniques", Paul Norkus and Kevin Noppinger, page 147.

10.2 CYANOACRYLATE ESTER

10.2.1 BACKGROUND:

Cyanoacrylate ester (CAE) also referred to as "superglue," is sold as a number of brands and in a number of viscosities. Items that are to be processed with CAE need to be exposed to an atmosphere rich in CAE fumes. This may be accomplished through the use of a traditional fuming chamber, superglue-fuming wand, or vacuum chamber.

10.2.2 SCOPE:

10.2.2.1 Fuming with cyanoacrylate esters (super-glue) is a process that is used to visualize latent print deposits on non-porous and some semi-porous objects. CAE processing also prepares the surface for the acceptance of powders and dye-stains that may enable further visualization of the latent prints.

10.2.2.2 When superglue vapors contact moisture and other components of friction ridge residue the cyanoacrylate ester polymerizes fixing the latents to the surface. This makes them more stable and less easily damaged.

10.2.2.3 The process is temperature, humidity, and pressure sensitive.

10.2.2.4 Objects that need additional forensic examinations such as trace or questioned document examinations should be carefully evaluated prior to processing to determine if this procedure will have an impact on subsequent examinations.

10.2.3 EQUIPMENT AND MATERIALS:

Relatively airtight container such as a tank or sealed plastic bag
Vacuum chamber
Superglue fuming wand
Cups/warm water (optional)
Low temperature heating element (optional)

10.2.4 REAGENTS:

Cyanoacrylate gel or liquid
One shot fuming kit or equivalent
Superglue cartridges

10.2.5 PROCEDURE 1 - TRADTIONAL FUMING CHAMBER:

10.2.5.1 Select the appropriately sized fuming chamber.

10.2.5.2 Place the surface to be processed in the chamber (suspend if possible).

10.2.5.3 Add control test.

10.2.5.4 Add humidity to the chamber via cups of hot water (larger chambers will require more cups, smaller chambers fewer).

10.2.5.5 Allow the chamber to warm (if necessary) and humidity to build (80 degrees Fahrenheit and 80 % humidity is optimal but

satisfactory results may be obtained at varying temperatures and humidity levels).

10.2.5.6 Add the CAE source.

10.2.5.6.1 Hot Plate Method - plug in the hot plate and place in the chamber. Add an approximately 2-3 cm in diameter pool of liquid superglue to a disposable aluminum dish and place on the hot plate.

10.2.5.6.2 Gel Packet Method - open and add one or more foil CAE gel packets (dependent on size of chamber, fuming rate, and analyst's preference) to the chamber. Once the gel is exposed to the air, the CAE will begin to vaporize at a controlled rate.

10.2.5.6.3 "ONE-SHOT" fuming kits - place the "activator solution" in the jar provided. Add the "activator canister" to the solution. Empty the CAE on to the top of the "activator canister." This method is generally reserved for crime scene response.

10.2.5.7 Secure the door to the chamber.

10.2.5.8 Fuming times will vary by the size of the chamber, the properties of the cyanoacrylate being used, the amount of heat and humidity, and the properties of the evidence being fumed. Control test should be carefully monitored by the analyst to prevent over or under fuming. Proper development is achieved when ridge characteristics on the control turn slightly white in color and begin to show good contrast. In the event of under fuming, the item may be re-fumed.

10.2.5.9 When development is complete evacuate the CAE fumes and remove the CAE source from the chamber.

10.2.5.10 Remove the item from the chamber and examine for comparable ridge detail.

10.2.5.11 Prints may be marked and photographed at this point, but are more commonly further enhanced with powders or dyes prior to preservation.

10.2.6 PROCEDURE 2 – SUPER GLUE FUMING WAND METHOD

10.2.6.1 In a fume hood or other well ventilated area, place a superglue cartridge over the end of the fuming wand. Select cartridge size dependent upon amount and size of evidence.

10.2.6.2 Set control level to high and ignite the fuming wand. Fumes should be visible once the wand is hot, approximately 1-2 minutes.

10.2.6.3 Lower the heat level if desired.

10.2.6.4 Conduct a control test.

10.2.6.5 Fume the item by holding the fuming wand approximately 4-8 inches away. Fumes from the wand will rise so it is best to direct the fumes below your item if possible or deflect the

fumes toward your item. Do not hold the wand too close or in the same area too long as damage and/or over development may occur.

10.2.6.6 Turn the fuming wand off and allow the unit to cool completely prior to removing cartridges or repackaging.

10.2.6.7 Examine item for comparable ridge detail.

10.2.6.8 Prints may be marked and photographed at this point, but are more commonly further enhanced with powders or dyes prior to preservation.

10.2.7 PROCEDURE 3 - VACUUM CHAMBER METHOD

10.2.7.1 Place items of evidence and controls into the vacuum chamber. It is not necessary to unfold garbage bags or leave large amounts of space between the items. *Do not place pressurize items such as sealed cans, bottles etc. in the chamber as they may explode.*

10.2.7.2 Add the CAE source. Foil CAE gel packs are recommended (number is dependent on chamber size and space), but a small dish with liquid CAE may also be used.

10.2.7.3 Place the lid on the vacuum chamber and close the release valve.

10.2.7.4 Turn on the vacuum pump.

10.2.7.5 Open the Gas Ballast Valve about one half turn.

10.2.7.6 Open the Isolation Valve (up position). If necessary, press on the lid until the chamber begins to evacuate.

10.2.7.7 Close the Gas Ballast Valve.

10.2.7.8 Evacuate the chamber to approximately 25 inches of mercury as shown on the chamber gauge.

10.2.7.9 Close the Isolation Valve.

10.2.7.10 Open the Gas Ballast Valve, wait 2-3 seconds and turn off the pump.

10.2.7.11 Close the Gas Ballast Valve.

10.2.7.12 Leave the items under vacuum for at least 20 minutes. There is no danger of over fuming.

10.2.7.13 Evacuate the chamber by slowly opening the release valve.

10.2.7.14 Remove glue and evidence. Examine item for comparable ridge detail.

10.2.7.15 Prints may be marked and photographed at this point, but are more commonly further enhanced with powders or dyes prior to preservation.

10.2.8 ADDITIONAL INFORMATION:

10.2.8.1 In the event of over-fuming, it may be possible to use an adhesive lifting technique (tape, gel lifter etc.) to lift away heavy upper deposits, revealing underlying ridge detail.

10.2.8.2 The "foil packets" may be stored at room temperature and have a shelf life of six months to a year. Liquid CAE and cartridges may be stored at room temperature with an indefinite shelf life.

10.2.8.3 CAE may be disposed of in the trash.

10.2.8.4 Analysts shall read the manufactures operating instructions for the super glue fuming wand and vacuum chambers prior to operating this equipment.

10.2.9 CONTROLS:

10.2.9.1 Testing of CAE and processing are performed at the same time.

10.2.9.2 A quality test print is applied to a non-porous surface and put into the tank in an easily-monitored position with the questioned surface. Placing one's own fingerprints on a black latent lift card works well for this purpose.

10.2.9.3 When the development of the control test is complete, the questioned surface is also finished. Positive results are indicated by development of a white print.

10.2.9.4 The area surrounding the intentionally deposited latent print shall serve as a negative control.

10.2.9.5 Results of control tests shall be documented in the laboratory case notes.

10.2.10 SAFETY:

10.2.10.1 Super glue fuming should only be conducted in well-ventilated areas. Precautions should be taken to avoid inhaling or allowing the vapors to contact the eyes, as the vapors can be irritating to the eyes, nose, and throat. Persons wearing contact lenses should not open CAE chambers without taking proper precautions. Non-vented goggles should be worn.

10.2.10.2 Precautions include using relatively sealed CAE chambers and evacuating the fumes from the chambers prior to removal of the questioned and test surfaces.

10.2.10.3 Gloves should be worn to prevent the cyanoacrylate from contacting the skin. If liquid glue is allowed to contact the skin, adhesion may result. If the skin sticks together, immerse affected areas in warm water. This will loosen the skin so that it can be gently pulled apart.

10.2.11 REFERENCES:

"Methods of Latent Print Development", Henry C. Lee and R. E. Gaensslen, 1987 Proceedings of the International Symposium on Latent Prints, pages 15-23.

Advances in Fingerprint Technology, Henry C. Lee and R. E. Gaensslen, (1991).

Journal of Forensic Identification, Vol.46, No. 4 July/August, 1996; Vol. 46, No. 1 January/February, 1996.

Coleman Vacu-Print Instructions and Notes, Lightning Powder, (1995).

Manual of Fingerprint Development Techniques, British Home Office, Chapter 4, (1998).

10.3 1,8 Diazfluoren-9-one (DFO)

10.3.1 BACKGROUND:

1,8 Diazfluoren-9-one is an analogue of the ninhydrin molecule. DFO develops latent prints containing amino acids. Resulting prints must be excited with an alternate light source in order to be visualized.

10.3.2 SCOPE:

10.3.2.1 DFO is used to develop prints on porous surfaces such as paper and cardboard.

10.3.2.2 DFO will detect latent prints on porous surfaces that ninhydrin will not and the reverse is also true. It does not replace ninhydrin but is used addition to it.

10.3.2.3 DFO should be used after iodine and prior to ninhydrin or physical developer.

10.3.2.4 Surfaces that need other forensic examinations such as trace or questioned document examinations should be carefully evaluated prior to processing to determine if this procedure will have an impact on subsequent examinations.

10.3.3 EQUIPMENT AND MATERIALS:

Fume hood
Balance
Magnetic stirrer/stirring bar
Alternate light source/filtered goggles
Lab oven
Beaker
Graduated cylinder

10.3.4 REAGENTS:

DFO
Methanol
Ethyl acetate
Acetic acid
Petroleum ether

DFO Stock Solution:

1. In a fume hood, dissolve 0.5 gram of DFO powder in 100 ml of methanol. This may be facilitated by use of a magnetic stirrer.
2. Add 100 ml of ethyl acetate and mix thoroughly.
3. Add 20 ml of acetic acid.
4. Store stock solution in a dark brown glass or polypropylene bottle.

DFO Working Solution:

1. Add 220 ml of stock solution to 780 ml of petroleum ether.
2. Mix thoroughly.

If less working solution is desired, halve or quarter the stock solution and petroleum ether accordingly.

10.3.5 PROCEDURE:

10.3.5.1 Conduct control tests.

10.3.5.2 Pour a sufficient amount of the working solution into a glass tray.

10.3.5.3 Dip the evidence into the solution for ten seconds (DFO may also be painted on). Although it is possible to spray this solution, it is *not recommended* due to the health hazards involved and its inability to soak the specimen adequately.

10.3.5.4 Allow to dry for approximately three minutes.

10.3.5.5 Repeat 10.3.5.3 and 10.3.5.4.

10.3.5.6 Apply dry heat.

10.3.5.6.1 When using a heat/humidity chamber, the specimen should be heated for ten minutes at 100° C (212° F) with a dry heat.

10.3.5.6.2 A hair dryer or dry iron will work as an alternative to an oven. Place a thick towel or other protective material on the counter, followed by the evidence, and then a few paper towels. Apply dry heat to the surface for several minutes. A dry iron can be placed directly on top of the paper towels and used the same as when ironing clothes. One advantage to this method is that it is possible to stop heating and check the progress with an alternate light source. If the latent prints are not very bright, continue to heat. Added heating time may improve resulting print development.

10.3.5.7 DFO-developed latent prints may or may not be visible to the naked eye and should be viewed under an alternate light source. DFO fluoresces when illuminated with monochromatic light in the 485 nm to 510 nm range.

10.3.5.8 Developed prints are evaluated to determine their suitability for comparison.

10.3.5.9 Prints deemed to be of value are marked and photographed using the ALS and a filter on the camera (orange or red).

10.3.5.10 Faint latent prints may be made to fluoresce brighter with a second or third application of DFO. The second and third applications of DFO (if necessary) are performed in the same manner as the first.

10.3.6 ADDITIONAL INFORMATION:

10.3.6.1 Shelf life of pre-mixed DFO is indefinite. The shelf life of the DFO stock solution and working solution is six months.

10.3.6.2 Excess reagent shall be collected and placed in the hazardous waste container located in the fume hood.

10.3.7 CONTROLS:

10.3.7.1 Testing of DFO is performed each day prior to use.

10.3.7.2 This test involves the making of a quality latent print on a test surface similar to the evidence being examined and following the processing procedure.

10.3.7.3 The test is illuminated with an alternate light source as outlined in 8.1.

10.3.7.4 An analyst shall not proceed with the processing of the evidence until a control test bearing positive results (yellow-green fluorescence) has been carried out and documented in the laboratory case notes and on the control tests work sheet.

10.3.7.5 The area surrounding the intentionally deposited latent print shall serve as a negative control.

10.3.8 SAFETY:

10.3.8.1 DFO has not been fully investigated for potential health hazards but is thought to be similar to ninhydrin, which may act as an irritant. Gloves, lab coats, and safety glasses should be worn when mixing and using DFO. The application of the DFO working solution should be performed in a fume hood, well-ventilated area, or while wearing an air-purifying respirator equipped with an organic vapor cartridge.

10.3.8.2 Glacial acetic acid is *corrosive* and extremely irritating to the eyes and respiratory system. Avoid breathing the vapors and use in a fume hood or with adequate ventilation. Glacial acetic acid will cause burns if it comes in contact with skin.

10.3.8.3 Methanol needs to be handled carefully and non-permeable gloves worn during mixing and use. Methanol is toxic in quantities as small as 30 ml and should not be allowed to come in contact with the skin, eyes, or mouth. It is possible for methanol to be absorbed through the skin. If methanol comes into contact with the eyes or mouth, the area should be flushed with generous amounts of water and a doctor may be consulted. Inhalation of methanol vapors should be kept at a minimum and the DFO should be used in a well-ventilated area.

10.3.9 REFERENCES:

Manual of Fingerprint Development Techniques, British Home Office, Chapter 4, (1998).

Technical Notes #1-0038, Lightning Powder Co., 1,8-Diazafluoren-9-One (DFO)

10.4 GENTIAN VIOLET

10.4.1 BACKGROUND:

Gentian Violet or Crystal Violet, is a biological stain used to dye epithelial cells and fatty components of latent print residues an intense purple color. Due to the toxic nature of this reagent, it should only be used in small quantities with the appropriate safety precautions observed.

10.4.2 SCOPE:

10.4.2.1 Gentian violet is a dye stain used in the laboratory to visualize latent print deposits on many types of adhesive surfaces.

10.4.2.2 Gentian violet may also be used on small non-porous surfaces contaminated with grease and oils. It is not suitable for water-soluble adhesives or porous surfaces.

10.4.2.3 Surfaces that need other forensic examinations such as biology or trace should be carefully evaluated prior to processing to determine if this procedure will have an impact on subsequent examinations.

10.4.3 EQUIPMENT AND MATERIALS:

Balance
Magnetic stirrer/stirring bar
Graduated cylinder
Glass beaker
Glass tray
Storage bottles

10.4.4 REAGENTS:

Gentian Violet or crystal violet
Distilled water

Gentian Violet Working Solution:

1. Weigh out 1 gram gentian violet.
2. Measure 1000 ml of distilled water and pour into glass beaker.
3. Slowly add the gentian violet.
4. Stir for approximately twenty-five minutes or until completely dissolved.

10.4.5 PROCEDURE:

10.4.5.1 Pour a sufficient quantity of working solution into a glass tray.

10.4.5.2 Conduct control tests.

10.4.5.3 Immerse the adhesive substrate into the working solution for 1-2 minutes.

10.4.5.4 Rinse with cool tap water. Developed latents will appear purple in color.

10.4.5.5 The above process may be repeated until optimal development of latents is achieved.

10.4.5.6 Developed prints are evaluated to determine their suitability for comparison.

10.4.5.7 Prints deemed to be of value are marked and may be photographed or lifted.

10.4.6 ADDITIONAL INFORMATION:

10.4.6.1 Shelf life of pre-mixed gentian violet and working solution are indefinite.

10.4.6.2 Excess reagent shall be collected and placed in the hazardous waste container located in the fume hood.

10.4.7 CONTROLS:

10.4.7.1 Testing of gentian violet is performed each day prior to use.

10.4.7.2 This test involves the making of a quality latent print on a test surface similar to the evidence being examined and following the processing procedure.

10.4.7.3 An analyst cannot proceed with the processing of the evidence until a control test bearing positive results (development of a purple print) has been carried out and documented in the laboratory case notes.

10.4.7.4 The area surrounding the intentionally deposited latent print shall serve as a negative control.

10.4.8 SAFETY:

10.4.8.1 Gentian violet/crystal violet is a suspected human carcinogen. It is known to effect the kidney, ureter, bladder, and thyroid of animals. It can be harmful if inhaled, and is irritating to the eyes and skin.

10.4.8.2 Gentian violet should not be used in large amounts.

10.4.8.3 A respirator should be used when working with the dry form. Gentian violet should be prepared and used in a fume hood or well-ventilated area. The analyst should wear a lab coat, heavy-duty (non-disposable) gloves, and safety glasses.

10.4.9 REFERENCES:

Chemical Formulas and Processing Guide for Developing Latent Prints, FBI, (1994).

Lightning Powder Technical Notes, "Crystal Violet," (2000).

Processing Guide for Developing Latent Prints, "Gentian Violet," USDJ/FBI, (2000).

10.5 NINHYDRIN

10.5.1 BACKGROUND:

Ninhydrin, triketohydrindene hydrate, reacts with the amino acids and proteins present in the latent print deposit to produce a characteristic purple color (Rhuemann's Purple). The combination of heat and humidity accelerates the reaction of the amino acids and ninhydrin.

10.5.2 SCOPE:

10.5.2.1 Ninhydrin is the most commonly used method for porous and semi-porous substrates. Excessive background discoloration may occur in substrates composed of a high plant or animal protein content (ex. leather and currency). It is it not effective on items that have been wet.

10.5.2.2 Ninhydrin processing should be performed after iodine and DFO processing and prior to physical developer.

10.5.2.3 Latent prints composed of blood can often be successfully darkened with the application of ninhydrin. This may be used on porous items as well as non-porous surfaces. To allow for further processing, non-porous surfaces should be processed with cyanoacrylate esters prior to the application of the ninhydrin reagent.

10.5.2.4 Surfaces that need other forensic examinations such as questioned document examinations should be carefully evaluated prior to processing to determine if this procedure will have an impact on subsequent examinations.

10.5.3 EQUIPMENT AND MATERIALS:

Balance
Magnetic stirrer/stirring bar
Beaker
Graduated cylinder
Glass trays
Brushes or tongs
Steam iron or heat/humidity chamber

10.5.4 REAGENTS:

N-Hexane
Acetic acid
2-propanol (isopropyl alcohol)
Ninhydrin crystals

Ninhydrin Stock Solution:

1. Place a one-liter beaker on the magnetic stirrer.
2. Add 300 ml of 2-propanol to the beaker.
3. Add 100 ml of acetic acid.

4. Place the stirring bar in the beaker and turn the stirrer on to a low level.
5. Add 50g of ninhydrin crystals to the solution. It may take up to two hours for the ninhydrin to dissolve.

Ninhydrin Working Solution:
1. Add 30ml of the ninhydrin stock solution to a one-liter beaker.
2. Fill the beaker to the 1-liter mark with N-Hexane.
3. Stir and clarify with 2-propanol as needed.
4. Upon standing in its storage container, some of the ninhydrin will "fall out of solution" causing a visible yellow layer at the bottom. Do not dip, brush, or spray items with this yellow layer.

10.5.5 PROCEDURE 1 - POROUS SUBSTRATES:

10.5.5.1 Conduct control tests.

10.5.5.2 Saturate the item with the ninhydrin working solution in a fume hood. Dipping is the preferred method, though brushing the solution on works well with large items. Spraying is the least desirable of the application options as this allows the solution to become airborne.

10.5.5.3 Allow the item to dry.

10.5.5.4 Expose the item to a warm (approximately 80°C) and humid atmosphere (approximately 65%-wet bulb temp.70°C for heat/humidity chamber). This can be accomplished in a heat/humidity chamber or with a hand held steam iron. The moving steam iron should remain approximately 1-2 inches above the surface, never being allowed to touch, as accidental contact will result in excessive discoloration.

10.5.5.5 Developed prints are evaluated to determine their suitability for comparison.

10.5.5.6 Prints deemed to be of value are marked and photographed as they may fade with time and may not be retrievable with reprocessing. It may be possible to increase the contrast between ninhydrin-developed prints and the substrate by black and white photography utilizing a green camera filter or through digital enhancement.

10.5.5.7 It is recommended that the item be re-examined after approximately 24 hours to ensure that no additional latent prints have developed.

10.5.6 PROCEDURE 2 - BLOOD ENHANCEMENT:

10.5.6.1 Ensure that the evidence has a blood component by having presumptive blood testing performed.

10.5.6.2 Determine if samples for biology should be taken prior to processing.

10.5.6.3 Conduct control tests.

10.5.6.4 "Fix" impressions using heat or methanol.
Blood can be fixed to the object by heating in a 100° centigrade oven for one hour (restricted to non-heat sensitive objects). Heat fixing may ruin latent prints that are composed of normal latent print constituents. Methanol may be pipetted over the item and limited to the stain so that the remainder of the surface is unaffected. Three or four applications of methanol are needed to fix the stain. Failure to fix the stain does not always render a poorer quality latent print.

10.5.6.5 Apply the working solution to the stain and allow the item to remain at room temperature for approximately 48 hours. The ninhydrin will turn the protein component of the blood/serum stain a dark purple and may develop portions of the latent not previously seen.

10.5.6.6 Developed prints are evaluated to determine their suitability for comparison.

10.5.6.7 Prints deemed to be of value are marked and photographed as they may fade with time and may not be retrievable with reprocessing.

10.5.7 ADDITIONAL INFORMATION:

10.5.7.1 Shelf life of pre-mixed ninhydrin is indefinite. The shelf life of the ninhydrin stock solution and working solution is up to one year.

10.5.7.2 Excess reagent shall be collected and placed in the hazardous waste container located in the fume hood.

10.5.8 CONTROLS:

10.5.8.1 Testing of the ninhydrin working solution is performed each day prior to use.

10.5.8.2 This test involves the making of a quality latent print on a test surface similar to the evidence being examined and following the processing procedure.

10.5.8.3 An analyst cannot proceed with the processing of the evidence until a control test bearing positive results (development of a purple print) has been carried out and documented in the laboratory case notes.

10.5.8.4 The area surrounding the intentionally deposited latent print shall serve as a negative control.

10.5.9 SAFETY:

10.5.9.1 Gloves, lab coat, and eye protection shall be worn when using or mixing ninhydrin. Precautions should also be taken to avoid inhalation of the fumes.

10.5.9.2 The solvent used in the ninhydrin working solution, Hexane, is *extremely flammable* and the solution is to be used or mixed in

a fume hood or in another well-ventilated area. Ensure that ninhydrin treated items are completely dry prior to exposing to the heat source.

10.5.9.3 Glacial acetic acid is *corrosive* and extremely irritating to the eyes and respiratory system. Avoid breathing the vapors and use in a fume hood or with adequate ventilation. Glacial acetic acid will cause burns if it comes in contact with skin.

10.5.9.4 2-Propanol, also known as Isopropyl Alcohol, is *flammable*. It is an irritant, and can be harmful if inhaled. Avoid breathing the vapors and use in a fume hood or with adequate ventilation.

10.5.10 REFERENCES:

Fingerprint Techniques, Andre A. Moenssens, (1971), pages 122-126.

Friction Ridge Skin, James F. Cowger, (1983), pages 96-98.

Processing Guide for Developing Latent Prints, FBI (2001).

Scott's Fingerprint Mechanics, Robert D. Olsen, (1978), pages 285-288.

10.6 PHYSICAL DEVELOPER (PD)

10.6.1 BACKGROUND:

Physical developer is a silver-based aqueous reagent that reacts with lipids, fats, oils, and waxes present in the fingerprint residue to form a silver-gray deposit.

10.6.2 SCOPE:

10.6.2.1 Physical developer is a method used for the development of latent prints on porous substrates. It is not suitable for non-porous surfaces.

10.6.2.2 This method is the final step in the sequential processing of porous items.

10.6.2.3 Physical developer is the only method to show adequate results on paper that has been wet, and has shown good results on paper currency.

10.6.2.4 Surfaces that need other forensic examinations such as body fluid, trace, or questioned document examinations should be carefully evaluated prior to processing to determine if this procedure will have an impact on subsequent examinations.

10.6.3 EQUIPMENT AND MATERIALS:

Graduated cylinder
Glass trays
Plastic tongs

10.6.4 REAGENTS:

Physical Developer Kit (parts A & B)

1. Any contamination may ruin the physical developer working solution. To avoid contamination use clean glassware rinsed with tap water, then with distilled water prior to beginning.
2. Add 5 ml of solution A (20% silver nitrate solution) to 90 ml of solution B (reductant solution) in a beaker.
3. Stir the working solution for approximately one minute with a clean glass/plastic stirring rod.
4. Do not mix the working solution until you are ready to use it as it does not have a very long shelf life once mixed.

10.6.5 PROCEDURE:

10.6.5.1 Arrange the glass trays in the stainless steel sink so that the evidence can be moved easily from one tray to another in the proper sequence.

10.6.5.2 Add the physical developer working solution to its dedicated glass tray.

10.6.5.3 Use plastic photographic tongs or plastic forceps without serrated edges to add or remove articles from PD solutions. Do not use metal tools.

10.6.5.4 Conduct control tests.

10.6.5.5 Immerse the item and gently rock the tray for approximately 5-15 minutes until friction ridge development is complete or adequate time has elapsed (analyst's discretion).

10.6.5.6 Remove the item from the physical developer working solution and place into a tray with running tap water. Rinse until the water runs clear.

10.6.5.7 Dry completely.

10.6.5.8 Developed prints are evaluated to determine their suitability for comparison.

10.6.5.9 Prints deemed to be of value are marked and photographed.

10.6.6 ADDITIONAL INFORMATION:

10.6.6.1 Cleanliness is important in the physical developer method. A good deal of the instability in the earlier solutions was a result of laboratory equipment that was not spotless. Some contaminants, especially salts, will cause the silver nitrate in the solution to come out of suspension thus spoiling the physical developer solution and perhaps ruining the item being examined. It is important to keep the glassware spotless and rinsed with distilled or de-ionized water prior to use. When washing glassware, use detergent, not abrasive cleaners.

10.6.6.2 Physical developer will cause dark stains on many surfaces. Care must be taken to avoid spills in the laboratory. Full strength chlorine bleach will usually remove any stains from counter tops and floors, but the bleach may cause damage to fabrics stained with physical developer.

10.6.6.3 Shelf life for ready to use kit (un-mixed) is six months from date of purchase. The reagent shall be mixed upon each use.

10.6.6.4 Excess reagent shall be collected and placed in the hazardous waste container located in the fume hood.

10.6.7 CONTROLS:

10.6.7.1 Testing of physical developer is performed prior to each use.

10.6.7.2 This test involves the making of a quality (oil based) latent print on a test surface similar to the evidence being examined and following the processing procedure.

10.6.7.3 An analyst shall not proceed with the processing of the evidence until a control test bearing positive results (development of a silver-gray print) has been carried out and documented in the laboratory case notes and on the control tests work sheet.

10.6.7.4 The area surrounding the intentionally deposited latent print shall serve as a negative control.

10.6.8 SAFETY:

10.6.8.1 Physical developer should only be used in well-ventilated areas, as it is irritating to the respiratory tract. Standard laboratory protocol is followed for chemical handling.

10.6.9 REFERENCES:

Manual of Fingerprint Development Techniques, British Home Office, (1999), Chapter 4.

Advances in Fingerprint Technology, Henry C. Lee, R.E. Gaensslen, (1994), pages 79, 80, 81, 95, 112.

Technical Note #1-2730, Lightning Powder Co., (1993).

10.7 RHODAMINE 6G

10.7.1 BACKGROUND:

Rhodamine 6G does not actually develop the latent print. The ridge detail must have already been previously developed through the use of CAE.

10.7.2 SCOPE:

10.7.2.1 Rhodamine 6G is a dye-stain used to aid in the visualization of CAE developed latents on non-porous substrates.

10.7.2.2 Rhodamine 6G should be used after CAE and prior to powdering.

10.7.2.3 Surfaces that need other forensic examinations such as body fluid or trace examinations should be carefully evaluated prior to processing to determine if this procedure will have an impact on subsequent examinations.

10.7.3 EQUIPMENT AND MATERIALS:

Balance
Spatula
Beaker
Spray or rinse bottles
Glass tray
Alternate light source/filtered goggles

10.7.4 REAGENTS:

Rhodamine 6G powder
Methanol or distilled water

Rhodamine 6G Working Solution:

1. Measure out approximately 0.1 gram Rhodamine 6G (about the size of a BB) and add to the storage bottle.
2. Add approximately one liter of methanol OR distilled water depending on the carrier you wish to use.
3. Seal the bottle and agitate gently to mix.
4. Label the bottle with the type of carrier used (distilled water or methanol).

10.7.5 PROCEDURE:

10.7.5.1 Suspend the item to be processed over a glass collection tray.

10.7.5.2 Irrigate the working solution over the item.

10.7.5.3 Rinse with an appropriate solution (methanol or water dependent on the working solution).

10.7.5.4 Allow the item to dry completely.

10.7.5.5 View the item through an orange filter using an alternate light source set in the 450 - 525 nm range. Visualization of

developed ridge detail is dependent upon the condition of the item and background interference.

10.7.5.6 Evaluate latent prints for comparable ridge detail.

10.7.5.7 Prints deemed to be of value are marked and photographed. Photography will require the aid of an orange filter on the camera and the use of an ALS.

10.7.6 ADDITIONAL INFORMATION:

10.7.6.1 The use of distilled water in lieu of methanol is useful when methanol may damage the item being processed, as may be the case with some lacquers, plastics, or tapes.

10.7.6.2 If there is concern over background staining, test a small area prior to processing the entire item.

10.7.6.3 The amount and strength of the dye-stain used is left to the analyst's discretion.

10.7.6.4 The pre-mixed Rhodamine 6G and the working solution have an indefinite shelf life when stored at room temperature.

10.7.6.5 Excess reagent shall be collected and placed in the hazardous waste container located in the fume hood.

10.7.7 CONTROL TESTS:

10.7.7.1 Testing of Rhodamine 6G is performed each day prior to use.

10.7.7.2 This test involves placing a drop of the Rhodamine 6G working solution on to a surface.

10.7.7.3 The test is illuminated with an alternate light source as outlined in the procedure section.

10.7.7.4 An analyst shall not proceed with the processing of the evidence until a control test bearing positive results (visible fluorescence) has been carried out and documented in the laboratory case notes and on the control tests work sheet.

10.7.7.5 The area surrounding the intentionally deposited working solution shall serve as a negative control.

10.7.8 SAFETY:

10.7.8.1 Rhodamine 6G is classified as a suspected animal carcinogen, but sufficient evidence of human carcinogenicity has not been established. Rhodamine 6G is thought to be relatively safe when exposure is at low levels. It should never be inhaled or allowed to get into the eyes or mouth, as it is an irritant. If this should occur, the eyes or mouth should be flushed with a generous amount of water and a doctor may be consulted.

10.7.8.2 Methanol is highly *flammable*. It needs to be handled carefully and non-permeable gloves worn during mixing and use of the stain. Methanol is toxic in quantities as small as 30 ml and should not be allowed to come in contact with the skin, eyes, or mouth. It is possible for methanol to be absorbed through the

skin. If methanol comes into contact with the eyes or mouth, the area should be flushed with generous amounts of water and a doctor may be consulted. Inhalation of methanol vapors should be kept at a minimum and the stain should be used in a well-ventilated area.

10.7.9 REFERENCES:

An Introduction to Lasers, Forensic Lights and Fluorescent Fingerprint Detection Techniques, E. Roland Menzel, (1991), pages 42-44.

Manual of Fingerprint Development Techniques, British Home Office, (1998), chapter 4

Chemical Formulas and Processing Guide for Developing Latent Prints, U.S. Department of Justice, F.B.I. Laboratory Division, (1994), pages 55-56.

Technical Notes #1-0041, Lightning Powder Co. Inc., pages 1-4.

10.8 SUDAN BLACK

10.8.1 BACKGROUND:

Sudan black B is a dye that stains fatty components to produce a blue-black image. It is considered to be a low-sensitivity method and contaminants such as grease are required as a target to which the reagent can bind.

10.8.2 SCOPE:

10.8.2.1 Sudan black is a dye-stain method used to develop friction ridge detail on non-porous waxy substrates and surfaces contaminated with grease, dried beverages, and foodstuffs. Sudan black will also enhance super-glue developed fingerprints.

10.8.2.2 Sudan black is not suitable for use on porous surfaces or dark colored items.

10.8.2.3 Surfaces that need other forensic examinations such as biology or trace should be carefully evaluated prior to processing to determine if this procedure will have an impact on subsequent examinations.

10.8.3 EQUIPMENT AND MATERIALS:

Beaker
Glass tray
Graduated cylinder
Balance
Spatula
Stirring rod
Glass bottle

10.8.4 REAGENTS:

Sudan Black B powder
Methanol
Distilled water

Sudan Black B Working Solution:

1. Place 15g of sudan black powder into a 2-liter glass beaker.
2. Add 1-liter of methanol and stir with a plastic stirring rod.
3. Add 500 ml of distilled water to the beaker and stir with the stirring rod. Some of the sudan black will not dissolve, but will remain as particulate matter. Pour the solution, including any solid matter, into a clean glass bottle with a tight-fitting screw top.

10.8.5 PROCEDURE:

10.8.5.1 Shake the container of sudan black working solution and pour a sufficient amount into a tray large enough to hold the item of evidence.

10.8.5.2 Soak the item for 2-3 minutes. For large items, irrigate the solution over the surface, catching the run off in a tray for reuse on the item.

10.8.5.3 Rinse the article in cool running tap water.

10.8.5.4 Allow the item to dry at room temperature.

10.8.5.5 Evaluate latent prints for comparable ridge detail.

10.8.5.6 Reprocessing can sometimes enhance faintly developed latent prints.

10.8.5.7 Prints deemed to be of value are marked and photographed. While it is possible to lift the prints with tape, the tape frequently does not lift the print sufficiently and prints that have been lifted have been known to bleed causing the image to blur. Therefore, it strongly recommended that prints be photographed prior to attempting to lift.

10.8.6 ADDITIONAL INFORMATION:

10.8.6.1 The pre-mixed sudan black and the working solution have an indefinite shelf life at room temperature.

10.8.6.2 Excess reagent shall be collected and placed in the hazardous waste container located in the fume hood.

10.8.7 CONTROL TESTS:

10.8.7.1 Testing of sudan black is performed prior to each use.

10.8.7.2 This test involves the making of a quality (oil based) latent print on a test surface similar to the evidence being examined and following the processing procedure.

10.8.7.3 An analyst can not proceed with the processing of the evidence until a control test bearing positive results (development of a blue-black print) has been carried out and documented in the laboratory case notes and on the control tests work sheet.

10.8.7.4 The area surrounding the intentionally deposited print shall serve as a negative control.

10.8.8 SAFETY:

10.8.8.1 The sudan black working solution contains methanol. Methanol is toxic in quantities as small as 30 ml and should not be allowed to come in contact with the skin, eyes, or mouth. It is possible for methanol to be absorbed through the skin. If methanol comes into contact with the eyes or mouth, the area should be flushed with generous amounts of water and a doctor may be consulted. Inhalation of methanol vapors should be

kept at a minimum and the sudan black should be used in a well-ventilated area.

10.8.9 REFERENCES:

Manual of Fingerprint Development Techniques, British Home Office, Chapter 4, (1998).

Lightning Powder Technical Note No. 1-0034, "Sudan Black", (May, 1995).

10.9 TRADITIONAL FILM DEVELOPMENT (BLACK AND WHITE)

10.9.1 BACKGROUND:

The primary function of film is to record the image that is focused upon it by the lens of a camera. The recorded image is called a latent image because it is not visible on the film; exposed film cannot be visually distinguished from unexposed film. However, the film has changed physically during exposure and that change can be made visible if the film is treated chemically. The chemical treatment that causes the latent image to become a visible image is called development.

10.9.2 SCOPE:

Develop latent images on traditional black and white film.

10.9.3 EQUIPMENT AND MATERIALS:

Film reel
Development tank

10.9.4 REAGENTS:

Kodak D-76 Developer
Kodak Fixer
Perma Wash
Photo Flo

10.9.5 PROCEDURE:

10.9.5.1 Wind film onto reels, place in the developing tank, and secure the lid. Handle undeveloped film in total darkness (no safe light).

10.9.5.2 Fill tank with tap water (approximately 70° F). Firmly tap tank to dislodge air bubbles. Soak film one (1) minute. Empty tank.

10.9.5.3 Fill tank with pre-mixed Kodak D-76 Developer. Firmly tap tank to dislodge air bubbles. Provide initial agitation of the development tank for 15-20 seconds. Agitate film frequently during development period. Develop film for fifteen to twenty (15-20) minutes. Return used D-76 developer to the developer storage container, using designated funnel.

10.9.5.4 Rinse film with tap water (approximately 70° F) for two (2) minutes. Empty tank.

10.9.5.5 Fill tank with pre-mixed Kodak Fixer. Firmly tap tank to dislodge air bubbles. Agitate film frequently during fixing. Fix film for fifteen to twenty (15-20) minutes. Return fixer to the fixer storage container, using designated funnel.

10.9.5.6 Rinse film with running tap water (approximately 70° F) for a minimum of two (2) minutes, twenty to thirty (20-30)

minutes if time allows. Empty tank. Film may be removed from tank at this point and examined.

10.9.5.7 Fill tank with Perma Wash, agitate and let stand for two (2) minutes. Perma Wash may be washed down the drain.

10.9.5.8 Rinse film with tap water (approximately 70° F) for two (2) minutes. Empty tank.

10.9.5.9 Fill tank with tap water (approximately 70° F), add two or three drops of Photo Flo and agitate. Photo Flo minimizes water/drying marks.

10.9.5.10 Remove film from reel, remove excess water from film, and hang till dry in a dust-free place.

10.9.6 ADDITIONAL INFORMATION:

10.9.6.1 Pre-mixed chemicals should be room temperature when used.

10.9.6.2 If negatives show a pink stain after fixing, the fixer may be near exhaustion or the fixing time was too short. If the stain is slight, it will not affect image stability or negative contrast. If the stain is pronounced and irregular over the film surface, re-fix the film in fresh fixer.

10.9.7 CONTROLS:

Not applicable

10.9.8 SAFETY:

Film development reagents may cause eye or skin irritation. If exposure occurs, rinse with generous amounts of water.

10.9.9 REFERENCES:

Police Photography, Larry S. Miller, pagers 27, 81-98.

Eastman Kodak Company, Kodak Professional D-76 Developer packaging. www.kodak.com/go/professional

Eastman Kodak Company, Kodak Professional Fixer packaging. www.kodak.com/go/professional

11 DIGITAL IMAGING PROCEDURE

11.1 BACKGROUND:
Latent print images are frequently captured, enhanced, and stored using digital devices. The intent of image enhancement is to make details of an image that are less visible more visible. Enhancement may be used to increase the contrast between the print and the substrate, reverse the color of the ridges, etc.

11.2 SCOPE:
This sets forth the Latent Print Section's procedures for the capture, storage, enhancement, and output of latent print digital images.

11.3 RESPONSIBILITIES:

11.3.1 Latent Section Supervisor

11.3.1.1 The Latent Section Supervisor shall act as the Digital Imaging System Administrator or appoint a Digital Imaging System Administrator.

11.3.1.2 The Latent Section Supervisor shall oversee and document the training of each new digital imaging system operator. This includes documenting competency testing.

11.3.1.3 The Latent Section Supervisor or designee shall assign a security level and a MoreHits system password for each operator cleared to work on the system.

11.3.1.3.1 One of the three following security levels may be assigned dependent of the functions of the examiner: "system administrator access", "standard user access", or "view access."

11.3.1.4 The Latent Section Supervisor or designee shall remove users from the More Hits system as needed.

11.3.1.5 The Latent Section Supervisor or designee shall act as a liaison with CJIS and Foray technical staff on system maintenance, upgrades, and when technical difficulties arise.

11.3.2 Digital Imaging System Administrator

11.3.2.1 The Digital Imaging System Administrator shall update the Latent Print Section Digital Imaging System User's Manual.

11.3.2.2 The Digital Imaging System Administrator shall update the digital imaging system settings such as "look-up tables."

11.3.2.3 The Digital Imaging System Administrator shall be responsible for file maintenance to include: tape back-ups, user logs, deletion of images or cases, and archiving.

11.3.2.4 The Digital Imaging System Administrator shall communicate system status to the supervisor and other system users.

11.3.3 Analysts

11.3.3.1 Analysts shall only use enhancement techniques that are supported by their training and/or experience.

11.3.3.2 Analysts shall maintain system security.

11.3.3.2.1 Network and program passwords are not to be distributed to unauthorized users. Operators may change their passwords as needed.

11.3.3.2.2 Ensure the external modem is off unless technical support is being contacted.

11.3.3.3 Analysts shall fill out the Latent Section CD/DVD Log when filing or retrieving archived images from the vault.

11.4 DIGITAL IMAGE CAPTURE

11.4.1 All digital evidentiary latent print images will be acquired through the MoreHits Forensic Image Tracking System.

11.4.1.1 MoreHits will automatically save the original image as well as the time, date, and user identification, thus establishing chain of custody for the original image. This original image will be designated using the file name structure "Image Number b.MHI" (ex. 1224b.MHI).

11.4.2 Analysts shall use one of the following digital image capture devices to acquire images of the prints(s) in question.

11.4.2.1 Flat Bed Scanner

11.4.2.2 Digital Camera

11.4.2.3 Camera Card

11.4.2.4 Film Scanner

11.4.2.5 Outside agencies may submit processed film for digital capture or digitally submit latent print images.

11.4.2.5.1 These images shall be acquired as an "existing file."

11.4.2.5.2 Images of latent prints should contain a scale.

11.4.2.5.3 It is preferred that existing images from outside agencies be submitted in a loss-less format such as "TIFF" and at as high a resolution as possible.

11.4.3 All original close up images captured by latent section analysts shall contain a scale in centimeters.

11.4.4 Images shall be captured at the highest resolution practical for their intended use.

11.5 DIGITAL IMAGE ENHANCEMENT

11.5.1 All digital evidentiary images requiring enhancement, shall be enhanced through the MoreHits Forensic Image Tracking System via Adobe PhotoShop using a copy of the original image.

11.5.2 MoreHits will save up to twenty-four enhanced images per original. Enhanced images will be designated using the file name structure "Image Number c.MHI" (ex. 1224c.MHI for the first enhancement of an original, 1224d.MHI for the second enhancement, etc.).

11.5.3 Enhancement steps must be documented in sufficient detail that a comparably trained analyst could repeat the steps and produce a comparable image.

11.5.3.1 All enhancement steps will be recorded in the order they are performed via use of the MoreHits Enhancement History Tracker program.

11.5.4 At the conclusion of the examination, the analyst shall print a hard copy of the MoreHits Image report and place it in the case file. The enhancement history for each image does not need to be included in the case file.

11.6 DIGITAL IMAGE STORAGE, ARCHIVAL, AND RETRIEVAL

11.6.1 All images, both original and enhanced, will be temporarily stored on the digital imaging system hard drive until the examination is completed.

11.6.2 Once completed, the case's originating analyst shall make an entry in the Digital Imaging Notebook on the "Cases to be Archived" form. The entry shall contain the date entered, analyst's initials, and complete case number to be archived.

11.6.3 A tape backup will be completed by the LPS Supervisor or Digital Imaging System Administrator no less than once a week, more often if needed.

11.6.4 Archiving of images will be completed by the LPS Supervisor or Digital Imaging System Administrator on an as needed basis.

11.6.4.1 It is recommended that images be recorded on Write-once Compact Disk Recordable (CD-R) or DVD-R.

11.6.4.2 The CD/DVD along with a printed copy of listed contents will be stored in the evidence vault. A printed copy of listed contents will also be placed in the Archived Cases Log Book.

11.6.5 All CDs/DVDs will be logged in and out of the vault using the "Latent Section CD/DVD Log" sheet. The log shall detail the CD/DVD title, date out/date returned, requesting analyst, and the person checking it in or out.

11.7 QUALITY CONTROL:

11.7.1 Performance checks will be conducted on equipment as needed.

11.7.2 When a problem is noted with a particular piece of equipment, software program, etc., the Digital Imaging System Administrator and/or Latent Section Supervisor will be notified.

11.7.3 If it is determined that the situation is persistent or cannot be easily rectified, an entry will be made on the "Instrument Maintenance Log".

11.7.3.1 The log will detail the date, the person making the entry, the piece of equipment/software involved, and relevant details of the situation.

11.7.4 Effected equipment/software will be taken off line and all users notified.

11.7.5 If necessary, technical support shall be sought and/or the equipment repaired before being put back into operation.

11.7.6 Corrective actions will be documented on the "Instrument Maintenance Log."

11.7.7 Image calibration shall be checked, as needed by comparing the scale in the printed image with a standard metric scale.

11.8 TRAINING

11.8.1 All analysts utilizing imaging technologies shall be trained and tested for competency in the standard operating procedures and the operation of the relevant imaging technologies.

11.8.2 Formal training may be modified at the discretion of the Latent Section Supervisor dependent upon previous training and/or experience.

11.8.3 Recommended formal training consists of:

11.8.3.1 Reviewing the ISP-FS Latent Print Section Digital Imaging Procedure.

11.8.3.2 Reviewing the MoreHits User Manual.

11.8.3.3 Reviewing the ISP Latent Print Section Digital Imaging User's Manual.

11.8.3.4 Review of relevant chapters of the Adobe Photoshop Users Manual and/or completion of a digital imaging course that utilizes Adobe Photoshop.

11.8.3.5 Satisfactory creation and digital processing of a mock-case using MoreHits and Adobe Photoshop software.

11.8.3.6 Satisfactory completion of a written test.

11.8.4 Continuing education shall be provided as courses become available through outside sources such as Foray, the FBI, etc.

11.8.5 Competency testing shall be repeated when significant changes in hardware or software are made.

11.9 REFERENCES:

International Association for Identification "Resolution 97-9."

More Hits-Enhancement History Tracker 1.0 User Guide.

More Hits User Manual-Forensic Image Tracking System, User's Guide, Version 2.0.

Scientific Working Group on Imaging Technologies (SWIGIT), "Definitions and Guidelines for the use of Digital Image Technologies in the Criminal Justice System," Version 2.3-June 6, 2002.

Scientific Working Group on Imaging Technologies (SWIGIT), "Recommendations and Guidelines for the Use of Digital Image Processing in the Criminal Justice System," Version 1.2-February 2001.

Scientific Working Group on Imaging Technologies (SWIGIT), "Guidelines and Recommendations for Training in Imaging Technologies in the Criminal Justice System," Version 1.2-December 6, 2001. *Forensic Science Communications,* April 2002-Volume 4-Number 2.

Scientific Working Group on Imaging Technologies (SWGIT), "Guidelines for Field Applications of Imaging Technologies in the Criminal Justice System," Version 2.3, December 6, 2001. *Forensic Science Communications,* April 2002-Volume 4-Number 2.

12 FRICTION RIDGE EXAMINATION METHODOLOGY

12.1 BACKGROUND:

12.1.1 Friction ridges are formed on the palmar portion of the hands and the plantar portion of the feet during fetal development.

12.1.2 The friction ridge arrangement is permanent throughout the life of the individual, barring trauma or disease.

12.1.3 Friction ridge skin is unique. No two areas of friction skin have ever been found to be duplicated between two individuals or within the same person.

12.1.4 An impression representative of the unique details of friction ridge skin may be transferred upon contact with a surface.

12.1.5 An impression containing a sufficient quantity and quality of detail may be individualized to or excluded from a particular source.

12.1.6 No scientific basis exists for requiring a pre-determined minimum number of friction ridge characteristics to be present in two impressions in order to establish a positive identification.

12.1.7 Individualization/Exclusion is supported by the theories of biological uniqueness and permanence, probability modeling, and empirical data gained through more than one hundred years of operational experience.

12.2 SCOPE:

Analysts shall apply the concepts of Analysis, Comparison, Evaluation, and Verification herein referred to as ACE-V methodology to all friction ridge impressions developed and preserved by the Latent Section or submitted by our customer agencies.

12.3 EQUIMPENT AND MATERIALS

Magnifiers
Pointers
Digital imaging system

12.4 PROCEDURE:

12.4.1 ANALYSIS is the assessment of a friction ridge impression to determine suitability for comparison.

12.4.1.1 The value of friction ridge impressions is assessed according the Quality and Quantity of detail they possess. Quality (clarity) and Quantity (amount) of detail may be influenced by the anatomical source (finger, palm, etc.), condition of the friction ridge skin, type of matrix, deposition factors, substrate considerations, environmental factors, development mediums, and preservation methods.

12.4.1.1.1 Level One Detail consists of overall ridge flow and pattern configuration. Level one detail may include information enabling orientation and can be used to determine anatomical source (i.e., finger, palm,

foot, etc.). Level one detail also includes general morphology (e.g., presence of incipient ridges, overall size). Level one detail cannot be used alone to individualize but may be used to exclude.

12.4.1.1.2 Level Two Detail consists of the individual ridge path, presence or absence of ridge path deviation (ending ridge, bifurcation and dot or continuous ridge), and ridge path morphology (e.g., size and shape). Level two detail is used in conjunction with level one detail to individualize or exclude.

12.4.1.1.3 Level Three Detail is confined to small shapes on individual ridges, relative pore positions, and other specific skin morphology (e.g., secondary creases, ridge breaks, etc.). Level three detail is used in conjunction with level one and two detail to individualize or exclude.

12.4.1.1.4 Other features associated with friction ridge skin (e.g., creases, scars, warts, paper cuts, blisters) may also be considered. These features may be permanent or temporary and exist as level one, two, or three detail. These other features may be used in conjunction with friction ridge detail to individualize or exclude.

12.4.1.2 Impressions deemed "of value" contain sufficient ridge detail to warrant a comparison in the opinion of the analyst. Impressions deemed "of value" proceed to the comparison step if there are known exemplars with which to compare and/or to AFIS once comparisons are completed or when there are no known exemplars with which to compare.

12.4.1.3 Impressions that do not contain sufficient detail to warrant a comparison in the opinion of the analyst are deemed to have "insufficient ridge detail" (IRD). This conclusion is noted as such in the case documentation.

12.4.1.4 Analysis of the unknown print also includes the selection of a suitable target area (core, delta, etc.) for use during comparison.

12.4.1.5 Analysis occurs independently of the Comparison, Evaluation and Verification steps of ACE-V.

12.4.2 COMPARISON is the side-by-side, back and forth, observation of friction ridge detail to determine weather the detail in two impressions is in agreement or disagreement.

12.4.2.1 The analyst systematically searches the known prints in an effort to exclude them and/or locate an impression that is consistent with the detail observed in the unknown print during analysis.

12.4.2.2 Comparison is based on similarity, sequence, and spatial relationship.

12.4.2.3 Comparison is carried out in an objective manner beginning with the unknown (or impression of poorest quality) and comparing to the known (or impression of better quality).

12.4.2.4 Requests for Fingerprint cards held by the Idaho State Police Bureau of Criminal Identification (BCI) shall proceed as outlined in Idaho State Police Procedure 11.02 section G.

12.4.2.4.1 The analyst shall make certified copies of the card(s) and/or scan the original card(s) into the digital imaging system. These copies/digital images shall be used for comparison purposes and the original cards returned to BCI.

12.4.2.5 The current national resolution standard for the transmission of 10-print images is approximately 500 ppi.

12.4.2.5.1 The following exemplars shall be considered to meet or exceed this standard and may be used for comparison purposes: original card, high quality certified photocopies, copies obtained from the FBI, AFIS archive printouts traceable to a single source, and digital images of original exemplars.

12.4.2.5.2 Faxed copies of known exemplars, non-certified, and/or poor quality photocopies do not meet comparison standards.

12.4.3 EVALUATION is the formulation of a conclusion based upon analysis and comparison of friction ridge impressions. Conclusions that may be reached are Individualization, Exclusion, or Inconclusive.

12.4.3.1 Individualization (Identification) is reached when both prints are in agreement and contain sufficient friction ridge detail in sequence having detectable uniqueness to eliminate all other possible donors.

12.4.3.1.1 Individualization shall be determined by a qualified analyst, applied to a common area in both impressions, based on quantity and quality of detail, contain no unexplainable discrepancies, and shall be reproducible.

12.4.3.1.2 No two prints will ever be exactly the same in *all* respects. Explainable differences are features that differ between a known and unknown print but can be explained as a result of distortion, slippage, twisting, printing defects, overlapping prints, etc.

12.4.3.2 Exclusion is reached when the prints being compared are in disagreement or contain an unexplainable discrepancy.

12.4.3.2.1 Exclusions should not be made unless comparison is made to *all* friction ridge surfaces of a suspect including the plantar portion of the foot. Instead,

the conclusion should be that the subject is excluded from having made an impression based on the available exemplars.

12.4.3.2.2 Exclusions shall be determined by a qualified analyst, applied to all comparable anatomical areas, be based on quantity and quality of the friction ridge detail, and be reproducible.

12.4.3.3 Inconclusive findings result from the absence of sufficient friction ridge details (lack of quantity or clarity) to effect a conclusion of individualization or exclusion. Inconclusive findings may also be attributed to the absence of a comparable area in the known exemplar.

12.4.3.3.1 Inconclusive conclusions shall not be construed as a statement of possible or probable identification as those conclusions are outside the acceptable limits of the science.

12.4.3.3.2 Inconclusive results shall be determined by a qualified analyst, be based on quantity and quality of the friction ridge detail, contain insufficient agreement or disagreement of the friction ridge details, and be reproducible.

12.4.4 VERIFICATION is the independent application of ACE methodology by another qualified analyst.

12.4.4.1 A qualified analyst shall verify all latent print comparisons and/or individualizations.

12.4.4.2 Analysts shall not verify any conclusions with which they are not comfortable. Comfort level is a function of training and experience.

12.4.4.3 Analysts are encouraged to work out differing conclusions through collaboration. If the conflict cannot be resolved, an International Association of Identification (IAI) certified examiner shall review the latent in question. If an individualization is effected, it shall be verified by an IAI Certified Examiner or the Latent Section Supervisor.

12.4.5 REFERENCES:

The Scientific Working Group on Friction Ridge Analysis, Study and Technology (SWGFAST) - *SWGFAST documents are officially published in the Journal of Forensic Identification*, 2006.

Fingerprint Whorld, Vol. 26, No. 101, July 2000, "Scientific Comparison and Identification of Fingerprint Evidence", pages 95-106. *Pat A. Wertheim.*

Journal of Forensic Identification, Vol. 41, No. 1, Jan/Mar 1991, "Ridgeology," pages 16-64. *Davis R. Ashbaugh.*

13 AFIS SUBMISSIONS

13.1 The Automated Fingerprint Identification System (AFIS) is housed in the Idaho State Police Bureau of Criminal Identification (BCI) and is operated outside the scope of Forensic Services.

13.2 Latent prints of AFIS quality shall be forwarded to AFIS at the conclusion of comparison to available exemplars.

13.2.1 The analyst shall Fill out an "AFIS INQUIRY FORM" with duel information (originating agency/ISP FS, originating agency case number/ISP FS case number, etc.).

13.2.2. Attach the AFIS form to the evidence to be submitted to AFIS (one form per AFIS submission).

13.2.3 Submit evidence and form to the custody of a Forensic Evidence Specialist.

13.2.4 An AFIS technician will check the evidence out from Forensic Services .

13.3 Upon return of the AFIS form and evidence, the analyst shall proceed according to the findings on the "results" section of the AFIS form.

13.3.1 If latents were "of no value for AFIS inquiry," they are reported as such in the case report.

13.3.2 If "no hit" was made, the analyst shall report out the number of latents searched in the case report.

13.3.3 In the event of an AFIS "HIT," candidate comparisons shall proceed as outlined in method 11 Friction Ridge Examination. The analyst shall report out the number of latents searched and resulting hits in the case report.

14 CASE WORK DOCUMENTATION AND REPORT WRITING

14.1 Case work documentation and report writing will be according to ISPFS Quality Manual, Section 5.10 Reporting The Results.

14.2 Documentation shall be to the extent that another qualified analyst would be able to determine each examination activity conducted, their sequence, results of the activities, and any conclusions reached.

14.2.1 As each development method is completed it is noted in sequence on the EXAMINATION WORKSHEET and the evidence is visually examined for the presence of comparable ridge detail.

14.2.2 When comparable ridge detail is observed, it should be preserved prior to additional processing.

14.2.2.1 Comparable ridge detail may be photographed upon initial examination, as additional detail develops, after a specific method, and/or prior to a subsequent method.

14.2.2.1.1 Latent print photographs/images and/or case documentation shall include a scale, unique case identifier, date, analyst's initials, impression source (description or source identifier), and significant information about the orientation and/or position of the latent print on the object through description and/or diagram.

14.2.2.2 Prints developed via powder processing may be lifted in lieu of photography.

14.2.2.2.1 Latent print lifts shall contain the unique case identifier, date, analyst's initials, impression source (description or source identifier), and significant information about the orientation and/or position of the latent print on the object through description and/or diagram.

14.2.3 Latent print examination documentation shall include which prints were analyzed, compared, evaluated, and the conclusions reached.

14.2.3.1 Each latent impression analyzed shall have an individualizing alpha and/or numeric designation.

14.2.3.2 The comparison value of each impression will be noted.

14.2.3.3 Latent impression documentation may also include, at the analyst's discretion, the anatomic source of the impression (finger tip, palm, etc.), pattern if discernable (L-slant loop, whorl, etc.) and level of clarity (1,2, 3).

14.2.3.4 Analysts shall document to whom the latents were compared, the results of those comparisons, and the identify of the verifier.

14.2.3.4.1 Documentation of individualizations shall include an annotation in proximity to the latent that includes the date of the individualization, the initials of the

analyst, the name of the person the impression was individualized to, and the area individualized (ex. finger #, palm etc.). The analyst shall also date and initial all exemplars used to effect the individualization(s).

14.2.3.4.2 The verifying analyst shall date and initial in proximity to the individualized impression(s) and on all exemplars used to effect the individualization(s).

14.2.3.4.3 Documentation of exclusions shall include, at a minimum, which impression(s) was excluded and the name of the person(s) the impression was excluded to.

14.2.3.4.4 Documentation of inconclusive findings shall include the reason(s) for the inconclusive finding. These reasons should be based on the complete exemplars and not the individual finger impressions on the exemplars (ex. latent lacks sufficient quantity/quality for individualization, exemplars smudged, over-inked/under-inked, incomplete exemplars, no exemplars (palms), tips not recorded, etc.).

14.2.4 The original or reproduction suitable for comparison of both the compared latent impressions and the known exemplars must be retained as part of the case record.

14.2.4.1 When the laboratory cannot ensure that the original latents or exemplars used and relied upon in the examination, will be maintained by the contributing agencies, the laboratory must maintain an image of the actual data.

14.2.4.1.1 Case documentation shall contain machine copies of all latent lift cards submitted by the customer. All latents deemed of value for comparison shall be preserved in the digital imaging system.

14.2.4.1.2 Latent lifts produced and retained in the laboratory do not need to be copied for the case file.

14.2.4.1.3 Case documentation shall contain originals or machine copies of all known exemplars used in the comparison. Known exemplars submitted by the customer agency shall be copied prior to being returned. Copies must be suitable for comparison.

14.2.4.1.4 Exemplars used to effect an identification, shall be preserved in the digital imaging system prior to being returned.

14.3 The report shall be as clear and concise as possible, convey the analytical findings and conclusions, and will be supported by scientific procedures.

14.3.1 The report is generally divided into three sections: EVIDENCE DESCRIPTION, EXAMINATION, and CONCLUSION. The following are some basic report wording guidelines categorized according to where they would appear in the report. There may be situations that do not fit the examples given. Unique wording for these situations will be developed as the need arises.

14.3.1.1 EVIDENCE DESCRIPTION:
Item # (Agency Exh.) – brief description of packaging and evidence.

Evidence was signed and sealed when received.

14.3.1.2 EXAMINATION:
Use for non-porous processing:
Items # - was/were examined both visually and with an alternate light source. It was/They were then fumed with cyanoacrylate esters, chemically processed with rhodamine 6g fluorescing dye, re-examined with an alternate light source, and powder processed.

Use for porous processing:
Items # - was/were examined both visually and with an alternate light source. It was/They were then chemically processed with iodine, ninhydrin, etc.

Use for retained evidence:
Latent prints of comparison value were marked and preserved. Latent lift cards/photographic evidence is/are being retained by ISP Forensic Services.

Use for exam of latents:
Latent prints were examined for comparable ridge detail.

Use for comparison:
Latent prints of value were analyzed and compared to a fingerprint card/certified copy of a fingerprint card bearing the name , SID# .

Use for AFIS search:
latent print(s) was/were entered and searched through AFIS by the ISP Bureau of Criminal Identification.

Use for AFIS HIT:

latent print(s) was/were entered and searched through AFIS by the ISP Bureau of Criminal Identification where SID # , , was generated as a possible candidate.

14.3.1.3 CONCLUSION:

Use for items not processed:
Item # was not processed.

Use for no analysis:
Item # is being returned without analysis.

Use for no friction ridge detail present (NDP):
Items # - no latent prints were observed or developed.

Use for insufficient ridge detail:
Latent prints marked # / additional latent prints/Remaining latent prints do not contain a sufficient amount of clear ridge detail necessary for individualization (identification).

Use for individualization:
The latent print marked # has been positively identified (individualized) to the # finger ( ) of the fingerprint card bearing the name .

Use when official name who produced the exemplar is known:
The individualizations was/were effected using a fingerprint card/certified copy of a fingerprint card recorded by official's name/# of the agency name on date.

Use when the agency that produced the exemplar is known:
The individualizations was/were effected using a fingerprint card/certified copy of a fingerprint print card recorded by the agency name on date.

Use when all latents have been ID'd:
All latent prints of value have been identified.

Use for inconclusive:
The latent prints marked # is/are inconclusive to the available exemplars bearing the name . The inconclusive results is/are due to a lack of quantity/clarity in the latent impression, the exemplars being smudged, over-inked/under-inked, and/or incomplete impressions, no palms provided, tips not recorded, etc.

or

latent prints was/were inconclusive to the available exemplars bearing the name . The inconclusive results is/are due to a lack of quantity/clarity in the latent impression, the exemplars being smudged, over-inked/under-inked, and/or incomplete impressions, no palms provided, tips not recorded, etc.

Use for exclusion:
Based on the available exemplars, is excluded from being the source of the latent impression marked # .
or
The impressions marked # lacks sufficient detail for individualization, but displays enough information to eliminate as the source.

Use for no prints of AFIS quality:
No latent prints of AFIS quality exist in this case.
or
The impressions marked # are not of AFIS quality.
or
AFIS does not have the capability to search latent palm prints or finger joints.

Use for no prints on file:
No fingerprints were found to be on file for .

Use to request FPC or palms:
In order to complete the comparison portion of this examination, it is requested that a high quality set of fingerprints/palm prints etc. be submitted for .

Use to request MCPs:
In order to complete the comparison portion of this examination, it is requested that a quality set of major case prints (palms, full fingers, sides of fingers, finger tips, etc.) be submitted for .

Use to request victim/elimination prints:
It is requested that a quality set of victim/elimination fingerprints/palm prints/MCPs be submitted for .

Use with requests for exemplars:
Item(s) # should be resubmitted at that time.

Use for suspect at a later date:

If a suspect/an additional suspect is developed by your agency at a later date, a fingerprint card or the appropriate suspect information should be submitted for comparison.

14.3.1.4 **Use for field services reports:**
On , at a.m./p.m., I received a request from Title/Name to respond to a/an type of scene. I responded with Forensic Scientist at a.m./p.m. I/We made contact with Agency/Officer's Title/name who briefed me/us on the scene.
I/We powder processed numerous items of glassware etc. for latent prints. Quantity/type of evidence was/were turned over to .
I/We cleared the scene at a.m./p.m.

14.4 The case file shall be organized in the folder from front to back as follows:
Report;
Examination documentation packet (notes, exam worksheets, copies/forms, digital imaging reports);
AFIS packet;
Administrative documentation (copies of submission forms, communication logs, agency reports, etc.).

14.5 The verifying analyst shall perform the technical and administrative review on the case. In the event that the verifying analyst is unavailable, the section supervisor may perform the reviews.

Appendix A
Latent Section Instrument Maintenance

Manufacturer's instrument manuals designated with * are on file in the latent section.

ALS*
For ALS maintenance see method 8.1.

Balance*
Balance is checked monthly using a set of ASTM weights as reference. Intermediate checks shall be documented on the QC worksheet. The allowable deviation from the standard weights is 0.01g or 0.1%, whichever is greater (.01g deviation for the 0.10g & 1.00g and 0.1g for the 100g weights).
If the balance fails a monthly check, the check will be repeated. If the balance still fails, it will be taken out of service until it can be recalibrated or repaired. The balance shall be tagged indicating that it is out of service. Maintenance, service calls, etc. will be recorded in the maintenance log.
Balances and ASTM weights used for checks are calibrated yearly by an outside source.

CAE Fuming Chambers
Maintenance shall consist of cleaning the tanks as needed.

Cameras*
General maintenance consists of wiping camera bodies with a soft cloth, blowing off lenses and mirrors to remove dust or dirt, and then cleaning with a soft cloth or eyeglass cleaner.
If a camera malfunctions, it will be taken out of service until it can be repaired. The camera shall be tagged indicating that it is out of service. Maintenance, service, etc. will be recorded in the maintenance log.

Chemical Exhaust Hoods (commercially purchased hoods*)
All hoods are equipped with continuous flow monitoring devices. Capture velocity at the open face of the commercially purchased hoods is at least 100 feet/minute. Capture velocity at the open face of the sink hoods ranges between 75-100 feet/minute.
If a hood fails a monthly check, the check will be repeated. If the hood still fails, it will be taken out of service until it can be repaired. The hood shall be tagged indicating that it is out of service.
General maintenance consists of cleaning. Filters are changed regularly by building maintenance staff. Additional maintenance shall be conducted as needed and will be recorded in the maintenance log.

Eyewashes and showers*
Function shall be checked monthly and documented on the QC worksheet. The purpose of this check is to flush the lines, check for leaks, etc. The eyewashes and shower are also checked annually by building maintenance. Maintenance, service, etc. will be recorded in the maintenance log.

Heat/Humidity Chamber*

The float valve, wick, drain, water reservoir, and distilled water filter will be checked prior to each use and documented on the Instrument Maintenance Log. Refer to the manufacturer's instrument instruction manual for details. The afore mentioned maintenance need not be performed more than monthly.

When using the chamber for ninhydrin processing, the glass should be warm to the touch and condensation within the chamber should be visible.

When using the chamber for DFO, the glass should be warm to the touch and no condensation should be visible.

If the above specifications are not observed, refer to the manufacturer's instrument instruction manual section on preventive maintenance and faultfinding. If the problem cannot be resolved, the chamber will be taken out of service until it can be repaired. The chamber shall be tagged indicating that it is out of service.

Maintenance, service calls, etc. will be recorded in the maintenance log.

KSI*

For KSI maintenance see method 8.2.

Magnifying Glasses

Magnifying glasses should be cleaned regularly with a high quality lens cleaner and soft cloth. No caustic chemicals should be applied to the lens.

Powder Station Exhaust Vents

Filters are washed periodically and replaced annually by the building maintenance staff. Additional maintenance is performed as needed. Maintenance, service calls, etc. will be recorded in the maintenance log.

Appendix B
Latent Section Consumables

Consumable	Grade / or Approved Vendor
Aluminum tins	Commercially Available
Amido Black 10B	Commercially Available
Camphor Blocks	Commercially Available
Casting Mediums	Commercially Available
Cyanoacrylate	Commercially Available
Crystal Violet	Commercially Available
DFO	Commercially Available
D-ionized Water	Laboratory or commercial
Ethyl Acetate	ACS or Better
Fingerprint Powders	Commercially Available
Fingerprint lifting cards	Commercially Available
Fingerprint lifting mediums	Commercially Available
Glacial Acetic Acid	ACS or Better
Gloves (Nitrile)	Commercially Available
Heico Perma-wash	Laboratory or commercial
Iodine crystals	Commercially Available
Iodine guns	Commercially Available
Ink cartridges	Commercially Available
Isopropyl Alcohol (2-propanol)	ACS or Better
Kodak D-76 Developer	Kodak or equivalent
Kodak Photo Flo 200 Solution	Kodak or equivalent
Kodak Rapid Fixer	Kodak or equivalent
Liqui-Nox detergent	or equivalent
Methanol	ACS or Better
Molybdenum disulphide	Commercially Available
N-hexane (95%)	ACS or Better
Ninhydrin Crystals	ACS or Better
Photo paper	Commercially Available
Physical Developer Kit	Commercially Available
Rhodamine 6G	Commercially Available
Sudan Black	ACS or Better

Appendix C
Latent Section Abbreviations
Updated 12/31/2006

Admin.	administrative
AFIS	Automated Fingerprint Identification System
ALS	alternate light source
BCI	Bureau of Criminal Identification
burg.	burglary
CA/CAE	cyanoacrylate ester
cert.	certified
CO.	county
Comp.	comparison
Cont.	containing
DFO	1,8-diazafluoren-9-one
DOB	date of birth
elim.	elimination
env.	envelope
ev./evid	evidence
Exh.	exhibit
FES	Forensic Evidence Specialist
FP	fingerprint
FPC	fingerprint card
GC	Gary Cushman
Ident.	Identification
Incon.	Inconclusive
IETS	Idaho Evidence Tracking System
IL	inherent luminescence
IRD	insufficient ridge detail
ISP	Idaho State Police
ISPFS	Idaho State Police Forensic Services
KSI	Krime Site Imager
L	left
lab.	laboratory
lg.	large
LLC	latent lift card
LP	latent print
LPS	Latent Print Section
Mat.	matter/material
NDW	Natasha Dee Wheatley
Neg.	negative
NDP	no detail present
Nin.	ninhydrin
NV	no value
PA	prosecuting attorney
PD	physical developer
PD	police department
pdr	powder
R	right
R-1	Region 1
R-2	Region 2
R-3	Region 3
R-4	Region 4
R-5	Region 5
R-6	Region 6
R6g	rhodamine 6 g
Req.	request
RP	Randy Parker
Sec.	section
SID#	state identification number
sm.	small
SO	Sheriff's Office
SPR	small particle reagent
S&S	signed and sealed
SS#/SSN	social security number
susp.	suspect
tech.	technical
TW	Tina Walthall
V.	verified by
Veg.	vegetable
vict./vic	victim