SAN DIEGO POLICE
FORENSIC SCIENCE SECTION

Questioned Documents Unit Manual

Issuing Authority: Frank Healy, Quality Manager

1.1 INTRODUCTION

UNIT DESCRIPTION

Office hours are based on an alternative work schedule and generally run from 0930 to 2000 hours. Staffing currently consists of one (1) full-time Document Examiner - and one part-time Document Examiner. Both examiners are trained in laboratory analyses of document related materials. All positions within this unit are filled by civilians.

UNIT FUNCTIONS

The unit is responsible for examining physical evidence inherent in questioned documents, drawing conclusions about source, authenticity, custody, and content, and issuing technical reports stating findings.

The examiners give expert testimony in court demonstrating examination results.

Services conducted include:

1. signature comparisons.
2. handwriting/handprinting comparisons.
3. number comparisons.
4. office machine comparisons
5. mechanical impression comparisons
6. trace/latent evidence examination
7. altered document examination.
8. chemical and mechanical erasure detection.
9. forgery detection.
10. fabricated document detection.
11. printing process analysis.
12. paper and ink analysis.
13. exemplar collection.

14. other miscellaneous document examination/preparation.

15. investigator training.

16. other duties as assigned.

2.1 WORK REQUESTS

The Documents Unit work request form PD-835 can be submitted to either the laboratory receptionist, the Documents Unit, the crime laboratory manager, or Questioned Documents Unit supervisor. A request may be submitted on other laboratory forms.

The request will be processed through the Clerical Unit for entry into the laboratory's work request database before it is distributed to the unit.

2.2 CASE ASSIGNMENT

Incoming cases are examined by the unit in order of priority, and then by date received. When a document examiner is ready for a new case, the examiner will take the next case in priority. Whenever an examiner begins work on a case, the supervisor will be informed.

If an examiner is already at work on a case when a higher priority case is submitted, the lower priority case will be repackaged and put away until the higher priority case is completed.

2.3 CASE TRACKING

All requests are logged into the laboratory computer database by the Clerical Unit.

Unit case statistics (completed cases, backlogged cases, etc.) are available upon request.

Case assignment and completion are tracked by the unit supervisor with the dates being entered into the laboratory case tracking database.

2.4 RECEIVING EVIDENCE

Evidence may reach the Documents Unit by the following routes:

1. The evidence can be impounded in the Property Room and received by the examiner.
2. A requesting officer can submit evidence directly to the examiner during walk-in examinations.
3. Direct transfers other than walk-ins.

Due to the importance of chain-of-custody, evidence submitted through inter-office mail will not be accepted. It will be routed back to the detective.

Impounded evidence is not to remain in the unit for more than one month if it is not being analyzed. The examiner must return the evidence and pick it up again later when the case is ready to be worked.

3.1 TYPEWRITER COMPARISONS

INTRODUCTION

Typewriting comparisons are based on the fact that the use of a typewriter, like any mechanical instrument, can cause wear and damage to its various working parts that may lead to the appearance of defects in the work from the typing source. The defects that occur from the wear and damage can serve to individualize the typing source. The identification of a typing source to its typed product or the identification of two typed products as having been produced by the same typing source is established by the agreement of the following:

The same size type

Identical typeface design

The same unique combination of identifying features

The same horizontal spacing

APPARATUS

Stereomicroscope

White light source, and possibly other light sources utilizing specific wavelengths such as the ALS and the VSC.

Typewriter alignment grids

SAFETY PRECAUTIONS

Established laboratory guidelines should be followed concerning the examination of typewriters and typewritten material that may be contaminated with biohazard or chemical material.

PROCEDURE

In conjunction with the steps outlined in this method, all other established laboratory guidelines and procedures are followed.

The following method is only a basic guideline for the examination of evidence submitted for typewriting comparisons. The actual typewriting comparison may include, but is not limited to, the points mentioned in the following method. The order in which the procedure is conducted is at the document examiner's discretion.

If the typewriter or typing system is electronic, it may be important for the questioned document examiner to become familiar with its operation so that any data stored in the machine or system will not be lost. Note and record the following settings as they were when the typewriter was received into the laboratory as evidence:

Margins

Tabs

Vertical spacing setting

Horizontal spacing setting on a dual escapement machine and what settings are available

Pressure settings

Ribbon settings if the ribbon is present (vertical and lateral)

Take the appropriate typewriting samples and examine the material for possible manufacturing or "wear-and-tear" defects, including, but not limited to, the following:

Printing defects:

Typeface

Alignment

Machine defects:

Variation in the spacing between letters or lines

Slippage of paper so successive lines are not parallel or evenly spaced

Improper ribbon operation affecting the printed impression

Defective operation of margin stops

Characters consistently "off their feet" on the bottom, side or top edges due to improper platen or typeface adjustment

Rebounding of characters

Transitory defects:

Dirty typefaces

Worn fabric ribbon

If the actual ribbon and/or correction tape is submitted and is readable, proceed to try to locate any questioned text or corrections. If the questioned text and/or corrections are located on the carbon ribbon or correction tape, attempt to make a paper fiber impression comparison or a physical match of the edges of the typewritten characters.

For all typewritten material submitted, examine it and take appropriate notes on the following:

Horizontal spacing

Vertical spacing

Interpol Classification

Bouffard's Typewriter Type Style Computer Classification system

Hard Copy F.B.I. Office Equipment Data Files

(It may not be necessary to reference all of these classification systems.)

Typing Mechanism

Type style

Ribbon type

Correction method

Right justification

Double-strike or bold type

Insertions and/or additions

Typist identification characteristics

Any defects or individual characteristics

After the suspect typewriter(s) and typewritten material have been examined, a comparison can be made between them to determine if there are similarities and/or differences between them.

Evaluate the significance of the similarities and differences noted.

Arrive at a conclusion.

Prepare a report.

CONTROLS

Immediately prior to using the ALS, VSC, or ESDA, run an appropriate control to ensure that the equipment is working properly. ALS and VSC controls are described in the Quality Assurance section on page 32. ESDA controls are described on page 34. Document the results in the case notes.

REFERENCES

Instructions for classification systems

FBI Typewriter Manuals

3.2 OBLITERATIONS

APPARATUS

Stereomicroscope

White light source, and possibly other light sources utilizing specific wavelengths such as the ALS and the VSC.

ESDA

PROCEDURE

In conjunction with the steps outlined in this method, all other established guidelines and procedures are followed, including basic guidelines for examination and handling of evidence and those for specific types of instruments used in the examination of obliterations.

The examination may include but is not limited to the points outlined in the method. The order in which the steps of the procedure are carried out is up to the individual forensic document examiner who is examining the evidence.

Examine the area of the obliteration with the stereomicroscope and look for fragments of the original writing.

Examine the obliterated area with the VSC and/or Alternate Light Source. If necessary, examine the obliterated area with the ESDA.

Acetate-assisted photocopying may be helpful in the decipherment of opaqued writing. Thick and colored substrates will hinder this method.

If necessary, an obliteration material, like white-out, may be removed. This is destructive to the document so it must not be done until all other examinations are completed and permission has been given from the submitting agency. While viewing the obliteration under low power magnification, use a scalpel or an Exacto knife to scrape away, little by little, the opaquing material.

If desired, make a photograph, photocopy or video print of the results.

Prepare a report.

CONTROLS

Immediately prior to using the ALS, VSC, or ESDA, run an appropriate control to ensure that the equipment is working properly. ALS and VSC controls are described in the Quality Assurance section on page 32. ESDA controls are described on page 34. Document the results in the case notes.

REFERENCES

Osborn, A. S., *Questioned Documents* 2d ed., Boyd Printing Co., Albany, NY, 1929

Conway, J. V. P., *Evidential Documents.* Charles C. Thomas, Springfield IL, 1959

3.3 PAPER EXAMINATIONS

APPARATUS

Microscopes

White light source, and possibly other light sources utilizing specific wavelengths such as the ALS, VSC, and ESDA.

PROCEDURE

Make a visual examination of the paper (both with and without the microscope) for the following features:

1) Color, brightness and opacity

2) Texture or pattern on the paper

- Smoothness

- Web or wove side

3) Watermarks

4) Weight

5) Size and shape of the paper

6) How the edges were cut

7) Fiber direction

Using the VSC, the UV light or the ALS, examine the paper for the presence of the following:

1) Fibers that fluoresce

2) Fluorescence of filler, starch, etc.

3) Wetting patterns

If desired, an ESDA examination can be made of the paper.

If more information needs to be obtained from the watermark for dating purposes, attempt to locate the manufacturer and obtain any relevant dating information.

Lockwood-Post's Directory can be helpful in obtaining the manufacturer's information.

When the examination is finished, incorporate the findings into a document examination report.

CONTROLS

Immediately prior to using the ALS, VSC, or ESDA, run an appropriate control to ensure that the equipment is working properly. ALS and VSC controls are described in the Quality Assurance section on page 32. ESDA controls are described on page 34. Document the results in the case notes.

COMMENTS

It is best to remember that within a ream of paper from a company, it is possible to find sheets that appear to be different from the other sheets. Therefore, if two sheets react differently to UV light and there is no other basis to differentiate them (such as watermarks, size, etc.), it may be difficult to say whether they came from the same or different sources.

REFERENCES

Osborn, A. S., *Questioned Documents* 2d ed., Boyd Printing Co., Albany, NY, 1929

Conway, J. V. P., *Evidential Documents.* Charles C. Thomas, Springfield Il, 1959

3.4 EXAMINATION OF PHOTOCOPIES AND LASER-PRINTED DOCUMENTS

INTRODUCTION

This method covers the procedures used in the examination of photocopied and laser-printed documents. Laser printers operate by the xerographic process and so their output can be analyzed in the same manner as photocopied documents.

The identification of a photocopier as the source of a copy requires that the method of production be similar (class characteristics) and that a unique pattern of defects (trash marks) be present on the platen, drum and/or lens. Fusing roller defects provide another source of individualizing marks. Recent color copiers also may incorporate anti-counterfeiting technology that may be used to identify a specific machine.

APPARATUS AND REAGENTS

Microscopes

Oblique lighting

White light source, and possibly other light sources utilizing specific wavelengths such as the ALS and the VSC.

Electrostatic Detection Apparatus

PROCEDURE

Determine what are the questioned photocopies and what are the known photocopies.

Examine the papers to see if they are similar or different. (Refer to the Procedure for Paper Examinations.)

Examine the toner for the following information:

Method of application:

Dry toner particles are placed on the document and are attached to the document using pressure, heat and/or hard and soft rollers.

Liquid toner will appear absorbed by the paper fibers.

On color copies, examine the pattern of toner particle placement.

Determine if a color copy is a 3 or 4 color process.

Examine the document(s) for any marks associated with the operation of the photocopier such as picker bar marks, roller marks, etc.

Examine any trash mark patterns that may identify the machine used to produce the document(s).

Examine the document with oblique lighting and/or ESDA to detect the indentations caused by fusing roller defects.

Examine color copies for an encoded pattern that may be present and could be used to trace the serial number of the machine through the manufacturer.

If needed, the examiner can refer the submitting agency to an ink/toner chemist to classify the toner, as an additional method of sourcing the photocopy.

Document all the observations, findings, and then prepare a report.

CONTROLS

Immediately prior to using the ALS, VSC, or ESDA, run an appropriate control to ensure that the equipment is working properly. ALS and VSC controls are described in the Quality Assurance section on page 32. ESDA controls are described on page 34. Document the results in the case notes.

REFERENCES

Hilton, Ordway, *Scientific Examination of Questioned Documents*, CRC Press, 1993

3.5 EXAMINATION OF PRINTING PROCESSES

INTRODUCTION

The identification of the type of printing process used to produce various documents is important in the examination and comparison of counterfeit and original documents and in the determination of the method of alteration and/or manufacture used to produce counterfeit or altered documents.

APPARATUS

White light source, and possibly other light sources utilizing specific wavelengths such as the ALS and the VSC.

Stereomicroscope

PROCEDURE

Using the appropriate apparatus, examine the documents for the characteristics listed for each of the different printing processes. The Forensic Document Examiner must also rely on his/her experience and training and may also use or request available standards for comparison. These characteristics are intended to be used as a general guide for process identification.

The Unit has a set of printing process standards that can be used for comparison purposes.

Letterpress

The printed edge of a letter, line or solid has a slight ridge, line or outline of heavier ink ("squeeze").

Halftone dots, if present, are round with sharply defined circular edges. Normally the individual halftone dot will be dark toward the edge and lighter toward the center.

Printing may cause embossing of the paper.

Flexography

The printed edge of a letter, line or solid has a slight ridge or line of heavier ink ("squeeze").

Halftone dots, if present, may be hollow.

No embossing.

May not have a sharply defined edge.

The cylinder used for this printing process can cause an ink squeeze effect that may show the direction of the printing.

Engraving/ Intaglio

The printed image is raised above the paper surface and is accompanied by an indentation on the reverse side of the paper corresponding precisely with the image.

There may be an increase in smoothness of the paper immediately around the image.

The printed image may have imprecisely defined edges under magnification.

Gravure

A cell pattern comprises the image and is usually seen as squarish dots separated by a grid of straight white lines (as opposed to the halftone dots of letterpress which may appear as different sized dots).

The ink may submerge the grid of white lines and may look mottled in appearance.

Some of the dots may have a hollow square or circle appearance or may have a "U", "V" or "C" void around the recessed cell.

Zigzag edges.

In color gravure, each dot is like a colored bubble with its own white highlight.

Tone differences are due to the varying depth and size of the cells.

Screen Printing

The texture of the screen may be apparent on the print.

It probably has a thicker layer of ink.

The edges may be “feathered” or serrated or show the “lines” of the screen.

Fluorescent ink may be used.

May be on various size and shape objects.

Lithography

Tone changes are due to varying dot sizes.

Smooth print surface.

Ink may be slightly dull.

There is no “ink squeeze” effect.

Smooth letter edges.

Capable of printing fine lines.

If the print is a halftone offset lithography print as the printing gets darker, the dots merge at their circumferences thereby forming a reverse effect of small white areas in areas of black.

Each dot will have a blurred edge but the ink will lie evenly within the dot.

Photographic

Image is never on the surface. Image is within the emulsion on the paper surface or within the paper.

Prints by other methods will always eventually have an identifiable hard edge between the ink and paper whereas a photograph will not have this edge.

Photographic medium is capable of imperceptible changes from pure white to pure dark.

Cannot focus onto a photograph.

Thermography

This is a finishing process where a plastic coating is put over another type of printing method (usually lithography) to give it the raised look and feel of intaglio.

Ink Jet

Dot matrix type pattern.

Ink is blown onto paper and may show spatter around printing or a splash effect around dots.

There is no embossing on the paper.

The Phase Change Printer is a type of ink jet printer that goes from a solid to liquid to solid type of ink instead of the traditional liquid ink usually associated with an Ink Jet Printer. A document printed with a phase change printer will have a "waxy" feel, a definite dot pattern and uses CMYK colors.

High-end ink jet printers appear as continuous tone printers because each pixel or dot is composed of anywhere from zero to thirty-one 15-micron dots.

Impact Dot Matrix

The dot pattern is usually made from a 7, 9, 18, 24 or 27 pin printer with the 9 and 24 pin printers being the most common.

Dots are mechanically impressed into paper.

Color dot matrix printers may consist of a combination of black, cyan, magenta and yellow or a combination of red, green and blue.

Usually uses a fabric ribbon.

Thermal Dot Matrix

Dot matrix pattern is apparent.

There is no embossing on the paper.

Printing must be on thermal paper. Thermal paper turns black when a drop of acetone is placed on the paper.

Typewriter

Cloth Ribbon

Printing may show a fabric pattern from the cloth ribbon.

Carbon Ribbon

Carbon from a ribbon is transferred to the paper and depending on the type of carbon ribbon used, it may flake off the surface of the paper.

Lift-off correction or cover-up correction may also be present.

Thermal Ribbon

Carbon from a ribbon is melted off and onto the paper.

A dot-matrix type pattern is present.

Check Writers

Impression formats can be ridge and groove impressions seen as parallel lines, pinhole impressions with the characteristic appearance of tiny holes through the paper stock or as embossing from the reverse side of the document.

Perforating check-writing machines can utilize liquid ink or an inked ribbon.

Electrostatic Printing

Dry Toner

Toner particles are seen clustered around printed areas and may be seen scattered on other areas of the paper.

Trash marks/drum marks may be present.

Liquid Toner

May give an appearance similar to lithographic printing.

Toner may appear on non-printed areas of the paper.

Trash marks/drum marks may be present.

Color Toner Process

Toner particles may be scattered on non-printed areas of the paper.

If it is a full-color process, toners in cyan, magenta, yellow and sometimes black will be present.

There may be scanning lines present in the toner.

Thermal Transfer
Appears as shiny wax-based ink.
Usually on smooth surface paper.
Ink will have a layered look and uses a three-color (CMY), four-color (CMYK) or a four-color process where the first color layer is a transparent wax base. This last process can be printed on plain paper.

Dye Sublimation
Has an appearance like a photograph.
Uses a three- or four-color process.
Tries unsuccessfully to duplicate the photographic continuous tone.
Special paper process.
"Ribbon like" surface pattern.

Laser Printing
Is composed of dry toner.
May have alias (stair-step effect) on edges.
May have drum defect marks.

CONTROLS

Immediately prior to using the ALS, VSC, or ESDA, run an appropriate control to ensure that the equipment is working properly. ALS and VSC controls are described in the Quality Assurance section on page 32. ESDA controls are described on page 34. Document the results in the case notes.

REFERENCES

Pocket Pal, International Paper, 17th Edition

3.6 DETERMINATION OF LINE SEQUENCE

INTRODUCTION

The determination of line sequence may be helpful in determining an addition to a document, alteration of a document, or the time sequence of producing a document.

In many cases, the examiner may not be able to make a definite determination of the line sequence.

APPARATUS

White light source, and possibly other light sources utilizing specific wavelengths such as the ALS and the VSC.

Stereomicroscope

Electrostatic Detection Apparatus

PROCEDURE

If possible, determine the direction of the stroke(s). (Refer to the method for the Determination of Direction of Writing Instrument Stroke.)

Examine the line intersection using the microscope, VSC, and alternate light source. Check for differences in inks used and check to see if material from the first writing is dispersed or redistributed along the later line.

Examine the paper surface to determine if paper fibers are dislodged, displaced, or distorted in such a way as to show writing sequence.

Examine the depressions in the paper formed by the writing instruments to see if the continuity or interruption of the wall or trough indicates line sequence. Observe skipping of the later stroke, narrowing of the later stroke where the two lines meet, and ink loading.

Examine the reverse side of the document at the line crossing.

If the line crossing involves carbon-typewritten impressions, lifting of the carbon may be necessary. However, this is a destructive process and approval must be obtained before destructive testing can be done.

Examine folded and creased areas of paper where line sequence is questioned by noting any breakage of the ink line, skipping, globbing, or leaching out of the ink into the disturbed paper fibers.

The Electrostatic Detection method should be followed.

Apparatus may be used to assist in the determination of line sequence by revealing, if it can be determined, which writing impressions gives a continuous impression on the ESDA print(s).

Many factors influence the determination of line sequence problems and this type of examination warrants extreme caution. Some of these factors include, but are not limited to, the fluidity and drying time of writing materials, pressure used to produce lines, colors of the ink (dark lines almost always appear to be on top, even when they are not), and the particular combination of paper, pens, pencil, carbon, etc. used.

When the examination is finished, incorporate the results into a document examination report.

CONTROLS

Immediately prior to using the ALS, VSC, or ESDA, run an appropriate control to ensure that the equipment is working properly. ALS and VSC controls are described in the Quality Assurance section on page 32. ESDA controls are described on page 34. Document the results in the case notes.

REFERENCES

Osborn, A. S., *Questioned Documents* 2d ed., Boyd Printing Co., Albany, NY, 1929

Conway, J. V. P. *Evidential Documents.* Charles C. Thomas, Springfield Il, 1959

STARTUP

Turn on the VSC2000.

Start the VSC2000 software.

CASE MANAGEMENT

Beginning a new case

Select "Case Selection" tab.

In the "New Case Folder" field, enter the case number (if there is no case number, enter the lab number or other unique identifier).

Click on the "OK" button.

Adding evidence items

Select the "Item/Exhibit" tab.

Click the "New File" button.

Enter the suspect's name in the "Case Description" field (if there is no suspect listed, use the victim's name or other identifier).

Select the operator from the drop-down menu

Click the "Save As" button.

Enter the item number in the "File name" field.

Click the "Save" button.

Adding notes

General

Select the "General Notes" tab.

Enter notes that pertain to the case.

Click on the "Save Comments" button.

Image

Select the “Image Preview” tab.

Select the item for which you wish to add a note.

Select the highlighted “Image” tab.

Enter notes that pertain to that item.

Click on the “Save Comments” button.

EXAMINATIONS

General

Beginning examination

Select the “Case Selection” tab

Click on the case you wish to examine.

Select the “Item/Exhibit” tab.

Select the item number in the “Item/Exhibit Files” list.

Click the “Main Screen” button in the upper left corner of the screen.

To use the Compact Video Microscope, click the “Imaging” button on the toolbar, and select “External Camera”. Change lenses as needed to achieve desired magnification.

Color / Black and White Cameras

The “Colour” button toggles between the black and white camera and the color camera.

Focus

Focus the camera by clicking the “Focus” button with the right or left mouse button, as appropriate.

Zoom

Optical

Zoom in or out by clicking the “Zoom” button with the right or left mouse button, respectively.

Digital

Change the level of digital zoom by left or right clicking on the double-headed arrow in either the “Digital Zoom” or “Required Mag.” Areas.

Contrast

Click on the up or down arrows or click and drag the contrast slider.

Brightness

Click on the up or down arrows or click and drag the brightness slider.

Color Balance (when the color camera is selected)

Click on the up or down arrows or click and drag the color balance slider.

Integration

Click the up or down arrows until the desired level of integration is achieved.

Infrared Reflectance

Place the evidence into the VSC2000.

Click the “Infrared” button.

Focus and zoom as desired to fill the frame with the desired area.

Click the “Live” button, if necessary.

Click the “Off” button for both filters, if necessary

Right click on the double arrow for the upper (longpass) filter slider until all filters have been used, saving images as desired.

Click the “Off” button for the longpass filter slider

Right click on the double arrow for the lower (bandpass) filter slider until all filters have been used, saving images as desired.

Click the “Off” button for the bandpass filter slider.

If desired, the longpass and bandpass filters may be used in combination.

Infrared Luminescence

Place the evidence into the VSC2000.

Click the “Spot” button

Focus and zoom as desired to fill the frame with the desired area.

Click the “Live” button, if necessary.

Click the “Off” button for both filters, if necessary.

Left click the double arrow for the “Spot” light source until it is set at 400/480

Right click the double arrow for the lower (bandpass) filter slider until all filters have been used viewing images as desired.

Click the “Off” button for the bandpass filter slider.

Repeat until all of the “Spot” light source wavelengths have been viewed.

Co-axial

Place the evidence into the VSC2000.

Click the “Co-axial” button

Focus and zoom as desired to fill the frame with the desired area.

Click the “Live” button, if necessary.

Click the “Off” button for both filters, if necessary.

Adjust brightness and contrast, as necessary.

Set integration level, as necessary.

Save images as desired.

Transmitted

Place the evidence into the VSC2000.

Click the “Transmitted” button

Focus and zoom as desired to fill the frame with the desired area.

Click the “Live” button, if necessary.

Click the “Off” button for both filters, if necessary.

Adjust brightness and contrast, as necessary.

Set integration level, as necessary.

Save images as desired.

Ultra-Violet

Place the evidence into the VSC2000.

Click the “Ultra Violet” button.

Focus and zoom as desired to fill the frame with the desired area.

Click the “Live” button, if necessary.

Click the “Off” button for both filters, if necessary.

Right click on the double arrow for the upper (longpass) filter slider until all filters have been used, saving images as desired.

Click the “Off” button for the longpass filter slider.

Right click on the double arrow for the lower (bandpass) filter slider until all filters have been used, saving images as desired.

Click the “Off” button for the bandpass filter slider.

If desired, the longpass and bandpass filters may be used in combination.

Oblique

Place the evidence into the VSC2000.

Click the “Side” button

Focus and zoom as desired to fill the frame with the desired area.

Click the “Live” button, if necessary.

Click the “Off” button for both filters, if necessary.

Adjust brightness and contrast, as necessary.

Set integration level, as necessary.

Save images as desired.

Spectrometry

Place the evidence into the VSC2000.

Focus and zoom as desired to fill the frame with the desired area.

Click the “Live” button, if necessary.

Click the “Off” button for both filters, if necessary.

Adjust brightness and contrast, as necessary.

Click the Spectrometer button on the toolbar.

Select spectrum type.

Follow on-screen prompts.

Save images as desired.

Scan

Place the evidence into the VSC2000.

Focus and zoom as desired to fill the frame with the desired area.

Click the “Live” button, if necessary.

Click the “Off” button for both filters, if necessary.

Adjust brightness and contrast, as necessary.

Click the Scan button on the toolbar.

Follow on-screen prompts.

When scan is completed, correct focus and exposure as necessary.

Save images as desired.

Compare

Place the evidence into the VSC2000.

Focus and zoom as desired to fill the frame with the desired area.

Click the “Live” button, if necessary.

Click the “Off” button for both filters, if necessary.

Adjust brightness and contrast, as necessary.

Drag the bandpass filter slider to the right until the inks begin to visually separate.

Drag the bandpass filter slider to the left until the inks again appear similar.

Click the Compare button on the toolbar.

Repeat as needed.

Save images as desired.

QUALITY ASSURANCE

Immediately prior to examining a case with the VSC 2000, the Documents Unit will test the VSC2000's IR, UV, Ultraviolet, and Transmitted Light functions by examining the four sample documents provided by the manufacturer and comparing the results with the manufacturer's results. The VSC settings used for analysis are displayed at the bottom of each captured image.

Document the results in the case notes.

REFERENCES

Foster & Freeman LTD., "VSC2000 Operations Manual"

3.8 ELECTROSTATIC DETECTION APPARATUS

INTRODUCTION

The ESDA (Electrostatic Detection Apparatus) is used to detect indented writing (latent impressions) on documents.

PROCEDURE

Throughout evidence processing, the instrument must be tested to confirm adequate operating performance. A control bearing indentations and embossings will be processed at the same time as the case evidence.

The humidification time is 5 to 15 minutes. A dry run of each document shall precede any humidification run.

Before placing the document on the sintered surface of the vacuum bed, wipe the surface with a dry tissue to remove dust or residual beads.

Before using the humidity chamber, wipe the inside of the lid and the wire rack with a dry tissue to remove excess moisture.

Place the document on the wire rack and close the cover and begin the humidification process.

Handling the document as little as possible, wearing gloves, place the document on the sintered surface and turn on the instrument pump.

Pull the imaging film across the top of the document and cut the film at the trailing end. Make sure to completely cover the document and the vacuum plate.

Gently flatten the film if necessary. Any wrinkles that may form can be removed by gently pulling at the side of the film. Do not touch the surface of the film because this will leave marks on the film.

Hold the back of the corona wand unit with the emitting side downwards and turn on the center "Corona" switch. Pass the wand across the document at least 4 times at a distance of 1-3 inches above the document. Turn the corona unit off and place emitting side down on a non-metallic surface. The corona wire contains a very high voltage so be careful when handling the unit.

Raising the vacuum bed at a slight angle, pour the Cascade Developer beads onto the surface of the imaging film so that the developer flows evenly over the surface of

the document. Continue pouring the developer until a suitable image is formed. Retrieve any Cascade Developer from the catch tray by tilting the tray and emptying it into a suitable container such as the Foster and Freeman canisters. Brush away any excess Cascade Developer beads that may be adhering to the surface.

If evidential indentations do develop, seal the toner on the ESDA lift with a laminating sheet. Peel the backing from a transparent adhesive fixing sheet and starting at one end of the document, carefully place the adhesive film onto the image. Rub softly over the fixing film so that it adheres well to the imaging film. Peel the fixed transparency lift from the vacuum bed and document, best accomplished with the vacuum pump still turned on. Place the lift on any smooth surface such as a whiteboard and work from the center outward to push away any bubbles that may have developed. Trim away the edges of the fixed transparency so no unfixed powder will be present. Turn off the vacuum pump.

The following information must be recorded on the lift:

- Examiner initials
- Barcode
- Date
- Time of humidification

All results, even if negative, shall be noted.

Any ESDA lift determined to be positive by the examiner will be treated as evidence. If the case is related to a homicide, all ESDA results will be lifted and retained as evidence.

QUALITY ASSURANCE

A Control which bears indented impressions is processed on the ESDA at the same time as the questioned document. The examiner creates the Control at the time of the examination by folding a small piece of paper in half and writing on one of the outer sides the date, case number, and the examiner's initials. The control is then unfolded and placed on the ESDA vacuum bed such that the inner sides, one embossed and one indented, are facing up. Document the results in the case notes.

A Grayscale Standard will be kept with the ESDA logbook. When the Cascade Developer used for indentation visualization is similar in appearance to the "6" Section of the Grayscale, it will be recharged using the following procedure.

RECHARGING (ADDING TONER TO) DEVELOPER BEADS

Place a funnel into a flask. Tap out a small amount of toner into the funnel. Pour beads into the funnel until the flask is approximately half full. Cap the flask and shake it vigorously to distribute the toner evenly over all of the Developer beads. The vigorous shaking of the glass beads within the glass flask also recharges the beads by triboelectrification. Compare these recharged beads visually to the Grayscale Standard. Repeat the process until the beads match the "3" or "4" Sections of the Standard. Pour these beads into a Cascade Developer canister.

Repeat the above process until all beads in all canisters have been recharged.

NOTE: Overcharged Developer beads will cause a very heavy background development, so it is best to proceed by small increments of added toner.

Recharging will be documented by making an entry in the ESDA logbook and marking the Cascade Developer canisters with initials and date.

COMMENTS

Humidifying documents may cause a reduction in the ability to visualize latent fingerprints. If latent print work is also desired on the questioned document, keep the humidifying time to a minimum, no more than 30 cumulative minutes.

REFERENCES

Waggoner, Lee R. *Use of the Electrostatic Detection Apparatus (ESDA) in Indented Writing Examinations,* unpublished paper

Foster & Freeman LTD., "ESDA Operating Instructions" Foster & Freeman LTD., "Application of the Instrument for the Detection of Indented Writing in Documents"

3.9 PHYSICAL MATCH OF PAPER CUTS, TEARS, AND PERFORATIONS

The Questioned Documents Unit follows ASTM Standard E2288 - Standard Guide for Physical Match of Paper Cuts, Tears, and Perforations in Forensic Document Examinations.

3.10 INTERPOL TYPEWRITER IDENTIFICATION SYSTEM

PROCEDURE

Determine the horizontal spacing in millimeters of the typewritten material using the procedure for American Society of Questioned Document Examiners Typewriter Alignment Grids or other suitable measurement tools.

Compare a lower case "t" from the typewritten material to the Interpol Typewriter Identification System and determine if the lower case "t" is a type "1" or a type "2."

Compare the numbers "2", "3", "4", "5", "6" and/or "9" to the Interpol System and determine if the number type style is a type "a" or type "b."

Compare the lower case "f" from the typewritten material to the Interpol System and determine if the lower case "f" is a type "1" or "2"

Compare the upper case "M" from the typewritten material to the Interpol System and determine if the upper case "M" is a type "A" or a type "B".

The above steps will provide a code (for example 260 1b2A). That code will be useful when examining comparable typeface exemplars found in the FBI Typewriter Type Styles manuals.

If all of the letters and numbers necessary to determine the complete code are not found in the questioned typewritten material, a partial code number may be determined. Exemplars that display letters and numbers from the partial code can then be used for comparison.

REFERENCE MATERIAL

FBI Typewriter Type Styles manual

3.11 TYPEWRITER TYPE STYLE CLASSIFICATION COMPUTER DATABASE

INTRODUCTION

The "TYPE" computer database is a DOS program, which can be launched from Windows, used to organize and systematically search and classify typewriter type styles.

OPERATION

The "TYPE" computer program is located on a computer in the Questioned Documents Unit.

When the "TYPE" program is accessed, a title screen appears.

Press "ENTER" and the main menu screen appears.

Choose "QUERY CLASSIFICATION" from the main menu.

Follow the Query Type Classification Screen directions and enter the information available about the questioned type style. The paper entitled "TYPE" / "TYPEWRITER TYPE STYLE COMPUTER CLASSIFICATION" and associated papers by Dr. Philip Bouffard may be referenced when entering information about a questioned Type style. It is helpful to initially enter only a minimum amount of information available about the questioned typeface so as not to exclude any possible type styles.

When the appropriate information has been entered, press the Page Down Key and at the "EDIT QUERY ABORT" prompt, select "QUERY" to make a search for the selected entries.

When the search is complete, the specimens found are displayed in the lower section of the screen. The number of records (typewriter specimens) in the system and the number of specimens that match the entered criteria are displayed on the screen.

At the top of the list are displayed all of the character selections in the group. Other characters not used in the initial search can be selected for an additional search by choosing those characters with different classification numbers.

When the search is complete, any of the matching specimens can be highlighted using the Up and Down Arrow Keys. The F10 key can be pressed to bring up the

"MEMO PAD" for the highlighted specimen. Press "ESC" to exit the "MEMO PAD" feature.

Select "P" if you want to print the specimens matching the criteria. When "P" is chosen, "DETAIL REPORT", "SUMMARY REPORT" or "ABORT" can be selected.

A "DETAIL REPORT" will print out all matching specimens, including a description of all the characters in the matching specimen. A "SUMMARY REPORT" is usually all that is necessary to print and check the listed possible typefaces. Any reports generated should be examined carefully to be sure that no type style has been excluded.

If information was left out when the type style characteristics were initially entered in the program, the report will include, instead of exclude, a type style that contains missing information.

To return to the "QUERY" function to search for additional characters, press "ESC."

To exit the program, highlight the "ABORT" command. Press "ENTER" and then use the Left and Right Arrow keys to highlight the "UTILITIES/EXIT PROGRAM" command. Press "ENTER".

REFERENCE

"TYPEWRITER TYPE STYLE COMPUTER CLASSIFICATION", Dr. Philip Bouffard.

3.12 TYPEWRITER ALIGNMENT GRIDS

INTRODUCTION

Typewriter alignment grids are used for the purpose of detecting alignment defects in typewritten material and insertions.

PROCEDURE

Determine the approximate horizontal spacing by measuring the number of typed letters that are in one inch of typewritten material. Common horizontal spacings are ten, twelve and fifteen characters to a horizontal inch. The ASQDE measurement grids are divided according to the number of millimeters that one hundred characters will occupy. Therefore, a horizontal spacing of ten characters to the inch would approximate the 254 ASQDE alignment grid, twelve characters to the inch would approximate the 212 ASQDE alignment grid and fifteen characters to the inch would approximate the 169 ASQDE alignment grid. Numerous other grids with different escapements are also available.

Choose the ASQDE grid/grids that most closely match the measured horizontal spacing and place over the typewritten material in question.

Determine which, if any, of the typewritten characters in the questioned typewritten material are out of alignment.

If using the ASQDE alignment grids to determine the presence of inserted material, check to see if all the typewritten material's alignment is consistent or whether sections do not align.

Document your findings in your case notes and refer to the appropriate technical procedure for type of case examination being conducted.

APPARATUS

Typewriter alignment grids

REFERENCE

Harrison, Wilson R., Suspect Documents, Nelson Hall, Chicago, 1958

3.13 POLYESTER ENCAPSULATION

OPERATION

Cut two pieces of polyester film at least an inch larger on all sides than the document to be encapsulated. Working on a grid may be helpful to ensure that the document is properly squared.

Wipe one sheet of polyester film with a soft cloth to remove dirt and establish a static charge. The sheet can then be placed on a grid if using one.

Carefully remove any loose debris from the document.

Place the document on the piece of polyester and align, allowing approximately a one-inch margin of polyester extending around all four sides of the document.

Apply l/4 or l/2 inch wide double-sided tape to the base polyester film sheet around all four sides of the document, at least l/4 inch away from its edge. At this stage, the brown protective paper is left on the upper side of the tape. Leave a slight gap in the tape in at least two corners to allow trapped air to escape. Each piece of evidence should be encapsulated separately and the evidence should not come in contact with the double-sided tape.

Wipe the second piece of polyester with a soft cloth and holding the second piece of polyester so it makes a "U", lay it on top of the document starting from the center and working outward. Carefully place a weight on the top piece of polyester film.

Carefully lift one corner of the top piece of polyester and remove the protective paper from the strips of tape bordering each side of the document. The polyester should be gently adhered along the lines of exposed tape.

Use a roller, squeegee, soft cloth or hand to remove any air pockets or bubbles.

Trim and round the corners of the capsule.

Mark the capsule with the case number / incident number, item number and initials.

ADDITIONAL INFORMATION

Dupont Mylar Type D polyester film or Cadco Polyester Film in the 5mm and/or 7 mm thickness may be used for the encapsulation.

3M number 415 double-sided tape in the l/4 or l/2 inch width may be used for this procedure.

REFERENCE MATERIAL

"Polyester Encapsulation: An Advance in the Protection of Documentary Evidence", unpublished article by Mary E. Switaj.

3.14 DETERMINATION OF DIRECTION OF WRITING INSTRUMENT STROKES

INTRODUCTION

It is important to determine, if possible, the direction of writing instrument strokes in comparative handwriting examinations and also in the determination of line sequence examinations.

APPARATUS AND REAGENTS

White light source and possibly other light sources utilizing specific wavelengths such as the ALS and the VSC
Stereo microscope
Video and/or Digital imaging systems

PROCEDURE

If the examination of the writing involves a ballpoint type of writing instrument, observe the striations that may be present. The striations will run toward the outside edge of the curve in the direction the pen was moving.
Observe the deposition of excess ink after a change in direction of the pen.
Determine which side of the paper fibers the ink or carbon deposits pile up against (on the side opposite the direction of travel).
Form an opinion, if possible, as to the direction of the strokes.
Incorporate the findings into a document examination report.

CONTROLS

Immediately prior to using the ALS, VSC, or ESDA, run an appropriate control to ensure that the equipment is working properly. ALS and VSC controls are described in the Quality Assurance section on page 32. ESDA controls are described on page 34. Document the results in the case notes.

REFERENCES

Osborn, A. S., *Questioned Documents* 2d ed., Boyd Printing Co., Albany, NY, 1929
Conway, J. V. P. *Evidential Documents.* Charles C. Thomas, Springfield Il, 1959

3.15 EXAMINATION OF HANDWRITTEN ITEMS

The Questioned Documents Unit follows ASTM Standard E2290 - Standard Guide for the Examination of Handwritten Items.

For Handwriting Exemplar Collection considerations, see “Collecting and Requesting Handwriting Exemplars” (page 2 of the Documents Unit work request form PD-835) attached at left.

See ASTM Standard E2290 attachment at left.

3.16 INK EXAMINATIONS

INTRODUCTION

Ink is examined in order to see whether it is similar to or different from other inks. This becomes important when examining a document for the presence of alterations or obliterations.

It is rarely possible to say that ink from written material came from a particular pen. At best, ink examination shows whether the questioned ink and a suspected source could contain the same kind of ink.

Some ink examinations are destructive. It is always preferable to conduct the non-destructive tests first and then decide whether the additional, destructive tests will be needed. If it is decided that destructive testing should be conducted, it is essential that permission be obtained from the submitting agency and the condition of the document be recorded before the destructive testing takes place.

APPARATUS AND REAGENTS

Microscopes

White light source, and possibly other light sources utilizing specific wavelengths such as the ALS and the VSC.

SAFETY CONSIDERATIONS

Refer to safety considerations outlined in the Standard Operating Procedures for the specific instruments or procedures used.

PROCEDURE

Visually study the document using unaided vision and microscopic assistance. Use different lighting sources, including daylight. Note the apparent colors and densities. Also note the characteristics of the type of inks used (ballpoint, felt tip, roller ball, porous tip, fountain, etc.).

Use the I.R. devices in the section to examine the inks and document observations.

If the forensic document examiner feels it may be helpful, use an alternate light source to examine the inks.

Note: If at this point the inks still appear similar, make a decision whether destructive testing would be helpful.

If a decision is made to conduct destructive (TLC) examinations, record and document the condition of the document(s) prior to the start of the TLC testing.

Consult an ink chemist to conduct the TLC examination.

After all in-house testing is completed; incorporate the results into a document examination report.

CONTROLS

Immediately prior to using the ALS, VSC, or ESDA, run an appropriate control to ensure that the equipment is working properly. ALS and VSC controls are described in the Quality Assurance section on page 32. ESDA controls are described on page 34. Document the results in the case notes.

COMMENTS

If additional testing is requested, e.g., dating, relative aging, manufacturer, etc., refer the submitting agency to people in the appropriate field.

REFERENCES

Brunelle, R. L., and Reed, R. W., *Forensic Examination of Ink and Paper* Charles C. Thomas, Springfield Il, 1959

3.17 INDENTED WRITING

The Questioned Documents Unit follows ASTM Standard E2291 – Standard Guide for Indentation Examinations.

4.0 REPORTING

NOTE TAKING IN HANDWRITING COMPARISON CASES

The four ways in which the Questioned Documents Unit may take notes on a handwriting comparison case are: filling in blanks on the note form; using highlighters to indicate similarities, differences or variations; placing descriptive comments on photocopies of evidence; drawing characteristics.

FILLING IN BLANKS

The note forms have sections for case information, class characteristics, results, and miscellaneous information which may be filled in by the examiner.

HIGHLIGHTERS

The examiner may use highlighters to indicate similarities, differences or variations on photocopies of documents. The color purple is used to indicate differences or variations. No other color has significance other than as an indicator of similarities.

DESCRIPTIVE COMMENTS

The examiner may choose to write comments on photocopies of evidence. These comments may include microscopic information not visible on the copy, descriptions of characteristics, or any other information the examiner feels is necessary.

DRAWING CHARACTERISTICS

In some cases, the examiner may use a pen, pencil, or highlighter to mark observed handwriting characteristics. The markings may look like geometric shapes or symbols, but are only used to illustrate similarities, differences or variations in the flow and style of compared handwriting. The markings or symbols are not abbreviations and do not provide a prescribed definition.

RELEASE OF PRELIMINARY RESULTS

Release of preliminary results is defined as a verbal comparison opinion that has not received any peer review.

For the Documents Unit, preliminary results may be released but they may not be of a degree higher than "similarities/differences" even if the examiner feels that the opinion may be probable, highly probable, or conclusive. Only after peer review can qualified or conclusive opinions be released.

CONCLUSIONS

The Questioned Documents Unit follows ASTM Standard E1658 – Standard Terminology for Expressing Conclusions of Forensic Document Examiners.

For conclusions of "Neither Eliminate Nor Identify (NENI)" or "Indications" (according to ASTM Standard 1658), the examiner will include a statement in the case notes to explain the uncertainty of the conclusion.

FINAL PACKET REQUIREMENTS

Standard Report

1. Typewritten or word-processed formal report
2. Documents examination request form
3. Questioned document note form
4. Copies of evidence on identification and qualified opinions
5. Display materials (optional)
6. Correspondence
7. Any additional official case documentation (i.e. chain of custody, etc.)

Homicide Report--Requirements Same as Standard Report Except:

1. All evidence must be copied regardless of opinion.
2. All questioned documents which are subject to destructive testing or

processing must be photographed or scanned..

3. All ESDA findings will be documented with ESDA lifts.

DISTRIBUTION

Final packets with notes will be given to the Clerical Unit for report distribution and filing in the main laboratory files.

STATISTICS

Case statistics will be submitted to the supervisor with each completed case.