FORENSIC DOCUMENT EXAMINATION ANALYTICAL METHODS

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Revision History

Revision #	Description of Changes
1	Original version
2	Introduction added, clarification to specific equipment used for each method, formatting and removal of examinations not completed by ISP Forensic Services.
3	AM 2 & AM 6: Update location for performance check documentation, clarified use and maintenance plans for instruments

Introduction to Forensic Document Examination Analytical Methods

1.0 Introduction

This manual defines the analytical methods for working most Questioned Document (QD) cases and references published SWGDOC and ANSI/ASB standards. The analytical methods include the examination of handwriting, document indentations, typewriting, non-impact printing processes, altered documents, writing inks, paper, physical match, stamping device impressions, checkwriter impressions, dry seal impressions, charred documents, liquid-soaked documents, and reporting.

The analytical methods outlined in this manual require that they be used in association with adequate training in laboratory policy, quality assurance procedures, and the specific subject matter by qualified document examiners with the knowledge of how to interpret the results obtained. Each case is unique, and the methods outlined in this manual are not a complete summary of all techniques available. It should not be relied on exclusively to cover every aspect which the examiner may come across in casework. In all cases, the skill, judgment, and expertise of the experienced examiner will make the final determination as to what is required in each case.

Forensic document examinations should be conducted prior to any destructive processing (e.g., 1st QD – 2nd DNA – 3rd latent prints). It is important that the Examiner consults with the customer and laboratory personnel regarding the order of item testing to avoid compromising subsequent examinations. The results of prior storage conditions, handling, testing, or destructive processing can interfere with forensic examinations.

The SWGDOC and ANSI/ASB standards referenced with this manual are available at www.swgdoc.org.

2.0 Reference Materials

The forensic document examination section has numerous reference materials including, but not limited to, certificates of vehicle titles, driver licenses, Haas Atlas, the U.S. Identification Manual, and New Zealand Police Document Examination Section Printing Process Manual. These reference materials are fully documented, uniquely identified, and properly controlled.

These reference materials are to be used in casework to assist in determining class characteristics of an evidence item. Any future collected reference materials will be recorded with the date collected, source, form number (if applicable), and kept with the rest of the reference materials.

3.0 Tools and Equipment

The tools and equipment used by the forensic document examination section are generally not used for identification or critical measurements but are used as aids in gathering data by observations and examinations of documents. At this time, critical measurements are not normally required in the questioned document cases submitted to this section. However, if critical measurements are required, a "NIST" (or other properly certified) traceable measuring device will be used. The forensic document examination section does not use critical reagents.

The following are specialized equipment specific to the analytical methods in forensic document examination:

Electrostatic Detection Apparatus (ESDA)

The ESDA is manufactured by Foster and Freeman and is used for the non-destructive analysis of documents to reveal indented writing and other impression evidence. The ESDA will be operated according to the manufacturer instruction manual and user guide provided near the instrument. A log will be maintained indicating the date and individual performing repairs or maintenance on the ESDA, performance checks will be documented in the case notes.

Video Spectral Comparator (VSC)

The VSC is manufactured by Foster and Freeman and provides a convenient and comprehensive method for the non-destructive analysis of inks and papers. The VSC is equipped with various light sources, filters (UV-Visible-IR), and connected to computer hardware and instrument specific software. This specialized instrument is used for differentiation of document samples and not for identification purposes. The VSC has magnification and image capture capabilities and can be utilized as a microscope when appropriate. The VSC will be operated according to the manufacturer's instruction manual and user guide. For repairs or maintenance: A log will be maintained indicating the date and individual performing repairs or maintenance on the VSC.

For case work examination a performance check should be completed, and the results of the check will be documented in the case notes.

The following are additional common tools, equipment, and off-the-shelf software that are generally used in the examination of documents:

- Stereo Microscope
- Hand Magnifier
- Fiber Optic Light Source (Incident and Oblique)
- Digital Camera
- Scanner
- Spacing and Alignment Grids
- Ruler
- Graphic Font Ruler
- Micrometer
- Adobe Creative Cloud/Photoshop

4.0 Quality Assurance

All forensic document examination cases are *technically* and *administratively* reviewed prior to distribution to the submitting agency. *Technical verifications* of physical comparisons are required for physical match and cut-and-paste examinations.

Analytical Method #1 Handwriting

1.0 Background/References

1.1 This method is a guideline to assist in the examination and comparison of handwritten items, to include hand printing, signatures, and cursive writing. The examiner may be further assisted by published standards and by appropriate commercial and private references.

1.2 References:

- ANSI/ASB Standard 011: Scope of Expertise in Forensic Document Examination
- ANSI/ASB Standard 070: Standard for Examination of Handwritten Items
- SWGDOC E01-13: SWGDOC Standard for the Examination of Handwritten Items
- SWGDOC G02-13: SWGDOC Standard for Minimum Training Requirements for Examiners
- SWGDOC Standard Terminology for Expressing Conclusions of Examiners

2.0 Scope

2.1 This analytical method provides procedures used by examiners for examinations and comparisons of handwritten items. This method includes the comparison of questioned and known items or of exclusively questioned items. The method is dictated by the objectives and by the case-specific material available of the items for examination.

3.0 Equipment/Reagents

- Stereo Microscope
- Handheld Magnifier
- Incident, Oblique, and transmitted light sources
- Scanner
- Digital Camera
- Adobe Creative Cloud/Photoshop

4.0 Procedure

4.1 Type of examinations, observations, and notes are to be recorded in iLIMS.

4.2 At various points in these procedures, a determination that a particular feature is not present or that an item is lacking in quality or comparability may indicate that the examiner should discontinue or limit the procedure.

4.2.1 It is at the discretion of the examiner to discontinue the procedure at that point and report accordingly or to continue with the applicable procedures to the extent possible.

4.2.2 The reasons for such a decision shall be documented.

4.3 Determine whether the type of examination is a comparison between questioned to known writing or a comparison of questioned-to-questioned writing.

4.4 Evaluation of questioned written items:

4.4.1 Determine whether the questioned handwritten item is original writing. If it is not original, request the original.

4.4.2 If the available questioned handwritten item is not original, assess the quality of the reproduction to determine if the writing details have sufficient clarity suitable for comparison purposes.

4.4.3 It is at the discretion of the examiner to discontinue the method at this point and report accordingly or continue with the procedures to the extent possible.

4.5 **Evaluation of questioned written items for distortion:**

4.5.1 Determine whether the questioned handwritten item is distorted writing. If it appears unnatural, determine whether the distorted writing is naturally prepared writing.

4.5.2 If a questioned handwritten item is not naturally prepared writing, or it is not possible to assess the spontaneity of the writing, the examiner is to determine if the apparently distorted writing is suitable for comparison and continue with the applicable procedures to the extent possible.

4.5.3 If it is determined that the questioned writing is not suitable for comparison, then the examiner is to discontinue the procedure and report accordingly.

4.6 **Evaluation of questioned written items for type of writing and variation**:

4.6.1 **Writing Type:** Note if there is more than one type of writing, then separate and group the single types of writing.

4.6.2 **Internal Consistency:** Note if there are inconsistencies within any one of the groups of writing type as separated in 4.6.1 (e.g. suggestive of multiple writers), then separate into another group, with each group containing an internally consistent type of writing.

4.6.3 Determined the range of variation of the writing for each group or sub-group that were separated by writing type and internal consistency of writing features.

4.6.4 Analyze the characteristics are present or absent in the questioned writing.

4.6.5 Characteristics and features to be considered include the following elements: freedom of execution, speed, and line quality; abbreviation; alignment; arrangement, formatting, capitalization; connectedness and disconnectedness; cross strokes and dots; diacritics and punctuation; direction of strokes; embellishments; formations; legibility; method of production; pressure emphasis; proportions; size; skill; slant or slope; spacing; initial and terminal strokes; range of variation with respect to each of the above features.

4.7 **Evaluation of known written items:**

4.7.1 Determine whether the known handwritten item is original writing. If it is not original, request the original.

4.7.2 If the available known handwritten item is not an original, assess the quality of the reproduction to determine if the writing details have sufficient clarity suitable for comparison purposes.

4.7.3 It is at the discretion of the examiner to discontinue the method at this point and report accordingly or continue with the procedures to the extent possible.

4.7.4 **Evaluation of known written items for distortion:**

4.7.5 Determine whether the known writing is distorted writing. If it appears unnatural, determine whether the distorted writing is naturally prepared writing.

4.7.5 If a known handwritten item is not naturally prepared writing, or it is not possible to assess the spontaneity of the writing, the examiner is to determine if the apparently distorted writing is suitable for comparison and continue with the applicable procedures to the extent possible. If additional known writing would be of assistance, the examiner should request additional known writing.

4.7.6 If it is determined that the available known writing is not suitable for comparison purposes, then the examiner is to discontinue the procedure and report accordingly.

4.8 **Evaluation of known written items for type of writing and variation**:

4.8.1 **Writing Type:** Note if there is more than one type of writing, then separate and group the single types of writing.

4.8.2 **Internal Consistency:** Note if there are inconsistencies within any one of the groups of writing type (e.g. suggestive of multiple writers), then the examiner is to contact the submitting agency for authentication of the group of known writing. If inconsistencies have not been resolved, then the examiner is to discontinue the procedures for the affected group(s) of known writing and report accordingly.

4.8.3 Determined the range of variation of the writing for each group or sub-group that were separated by writing type and internal consistency writing features using sections 4.9.1 and 4.9.2.

4.8.4 Analyze the characteristics in the known writing. (see procedure 4.6.5)

4.9 **Evaluation of Comparability:**

4.9.1 Depending on the type of examination, the examiner will determine the comparability of the bodies of writing (questioned writing compared to known writing or questioned writing compared to questioned writing).

4.9.2 If the bodies of the writing are not comparable for a questioned-to-questioned writing comparison, then discontinue the comparison procedure

4.9.2.1 Report reasoning for discontinuation of comparisons accordingly.

4.9.3 If the bodies of writing are not comparable for a questioned to known writing comparison, then discontinue the procedure and request comparable known writing.

4.9.3.1 If known writing is made available, then proceed with evaluating the known writing with procedure 4.8.

4.9.3.2 If comparable known writing is not made available, then discontinue the procedure and report accordingly.

4.10 **Side by Side Comparison of available or applicable portions of the bodies of writing.**

4.10.1 Whether the type of examination is questioned to questioned writing or questioned to known writing, and the defined handwritten items have comparable bodies of writing, then the examiner will perform a side-by-side comparison of the comparable portions of the bodies of writing.

4.10.2 Determine whether there are differences, similarities, and absent characters between the comparable portions of the bodies of writing and evaluate the writing characteristics individually and in combination.

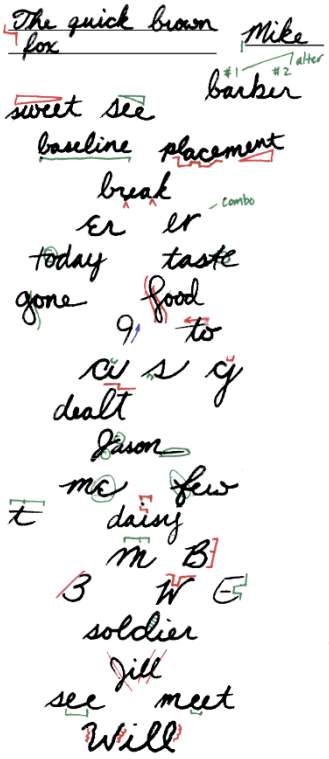
4.10.3 The examiner will determine if the quantity of questioned writing or known writing is sufficient for a complete comparison.

4.10.3.1 If the quantity of the questioned writing, or known writing, or both is a limitation for a complete comparison, the examiner will continue with the comparison to the extent possible.

4.10.3.2 The examiner may request additional known writing if available. If additional known writing is made available, then proceed with evaluating the known writing with procedure 4.7.

4.11 Based on the handwritten items available for submission and interpretation, the examiner will analyze, compare, and evaluate the comparable portions of the bodies of writing for discriminating writing features.

4.11.1 The writing features and other elements considered include the following notations: Markings in green signify similarities, red indicate differences, and blue are neutral (e.g. clarification of construction, missing letter, direction). Use of an arrow marking is an appropriate alternative symbol (e.g. letter construction, connections, introductory/ terminal strokes).



Alignment
Alternative construction / form
Ascending / Descending
Baseline placement
Break
Combination
Connections
Curvature
Direction
Gap / Opening
Height relationship
Introductory / Terminal strokes
Letter construction
Placement
Proportions
Relative lengths
Shape / Volume
Slope
Spacing
Tremor

4.12 The examiner will determine the significance of the similarities, differences, and limitations of the comparison and evaluate the writing characteristics individually and in combination. Record the finding in the notes.

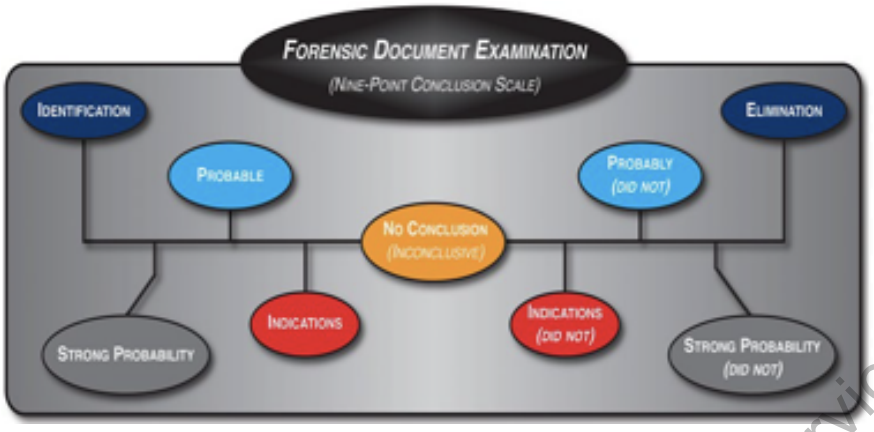
4.13 **Interpretation and Documentation of Results**

4.13.1 Results will reflect the scope of the examinations, strength or shortcomings of the evidence, and limitations of the findings.

4.13.2 Reported conclusions as to writer authorship will refer to the SWGDOC Standard Terminology for Expressing Conclusions of Examiners as follows:

- Identification
- Strong probability (qualified conclusion)
- Probable (qualified conclusion)
- Indications (qualified conclusion)
- No conclusion
- Indications did not (qualified conclusion)
- Probably did not (qualified conclusion)

- Strong probability did not (qualified conclusion)
- Elimination



4.13.2.1 Reported conclusions shall include an explanation of the terminology expressed in conveying the weight of the evidence.

4.13.3 Documentation of results and conclusions:

4.13.3.1 When reporting conclusions and interpretations of examination and/or comparisons between one or more items, detailed descriptions of the examinations performed, and how the conclusions were reached must be documented in the analytical notes.

4.14 Electronic Documentation (Electronic comparison charts and photographs)

4.14.1 Electronic renditions and notes will be stored in the case file.

4.14.2 Photographs shall be digitally retained by the laboratory.

Analytical Method #2 Document Indentations

1.0 Background/References

1.1 This procedure is a guideline to assist in the examination of documents or other substrates for indentations and other substrate disturbances. Impression evidence often results from the incidental transfer of handwriting pressure or mechanical action of a device impressed from one document or other substrate to another document or other substrate.

1.2 Nondestructive optical and electrostatic techniques are used for the detection of indentations and can reveal sources of documents, page substitutions, additions and alterations, sequence of writing, and other evidence significant to the source or creation of documents. The examiner may be further assisted by published standards and by appropriate commercial and private references.

1.3 References:

- ANSI/ASB Standard 011: Scope of Expertise in Forensic Document Examination
- ANSI/ASB Standard 44: Standard for Examination of Documents for Indentations
- SWGDOC G02-13: SWGDOC Standard for Minimum Training Requirements for Examiners

2.0 Scope

2.1 This analytical method provides procedures used by examiners for examination of indentations on documents.

3.0 Equipment/Reagents

- Stereo Microscope
- Hand Magnifier
- Incident, oblique, and/or transmitted light sources
- Electrostatic Detection Apparatus (ESDA) and related processing equipment
- Video Spectral Comparator (VSC)
- Scanner
- Adobe Creative Cloud/Photoshop
- Digital Camera

4.0 Procedure

4.1 Type of examinations, observations, and notes to be recorded in iLIMS.

4.1.1 Prior to the application of examination methods, capture the image of the document.

4.2 The examiner will assess each document to determine the course of examination method. *Limiting factors which can affect the suitability of a document for an indentation examination include prior destructive processing, copy versus original, printing process, writing instrument, and substrate.*

4.2.1 If it is necessary to remove staples, post-it notes, or other attached documents, then permission from the submitter must be obtained and the original condition of the evidence documented.

4.3 There is no required order for examination using the following procedures.

4.4 Care should be taken to avoid degrading, changing or addition of new indentations.

4.5 **Optical Examination**

4.5.1 Both sides of the document are examined with various angles of lighting sources and magnification to determine if indentations or other fiber disturbances are visualized.

4.5.2 If indentations or other fiber disturbances are visualized, the examiner will evaluate and preserve.

4.5.2.1 If readable, the examiner can preserve the visualized evidence by transcription. If visualized impressions are faint and not readable, then digital image capture is necessary.

4.5.2.2 If indentations or other fiber disturbances are not visualized, the examiner will document the lack of visible impressions.

4.5.3 Determine if the item is suitable for ESDA examination. If the item is not suitable for ESDA examination and the examiner has used appropriate optical examination techniques to the extent possible, then report accordingly.

4.6 **Electrostatic Detection Apparatus (ESDA) examination**

4.6.1 The examiner will follow the ESDA Manufacturers operating manual for proper equipment operation.

4.6.2 A performance check of the ESDA equipment will be performed with a control indentation test on the same day of item examination.

4.6.2.1 The control results will be recorded in the case notes.

4.6.3 If the control does not demonstrate proper performance, then troubleshoot and correct ESDA according to Manufacturers recommendations. Any repairs completed or corrective action of the ESDA will be documented in the equipment log.

4.6.4 Process both sides of the document or other suitable substrate. Various ESDA processing techniques are available for the examiner.

4.6.5 After proper processing techniques, the examiner can preserve the test result by fixing film (lifts), digital image capture or both.

4.6.5.1 ESDA results will be created as a sub-item and treated as evidence. New ESDA sub-items will be maintained according to laboratory policy.

4.7 **Evaluation of Indentation evidence**

4.7.1 Study and evaluate both optical digital images and ESDA lift results.

4.7.2 Attempt to decipher impression evidence from the optical digital images and the ESDA lifts.

4.7.3 Image enhancements as well as overlaying multiple lifts are additional peer reviewed techniques used for decipherment purposes.

4.7.4 Indentation evidence may provide information for subsequent document examinations. Such follow up examinations may include the determination of:

- Source document
- Source writer
- Source device
- Sequence of indentation and entries
- Date of indentation

4.8 **Limitations**

4.8.1 Certain items can introduce limitations for examination. The size, shape, density, or condition of an item might make it less suitable for the ESDA testing procedure.

4.8.2 Conditions relating to prior storage, handling, or analysis can potentially interfere with the examination.

4.8.2.1 Minimize handling of items prior to ESDA examination to avoid contamination.

4.8.2.2 Improper handling may also impact the ESDA examination results.

4.8.3 Chemical or other potentially destructive processing should be completed after examination by the forensic document examination section(eg Latent print or biological processing)

4.8.4 High humidity may affect ESDA examination

4.8.5 Degradation of images may occur with repeated ESDA processing.

4.9 **Interpretation of Results and Reporting:**

4.19.1 Results will reflect the scope of the examinations, strength or shortcomings of the evidence, and limitations of the findings.

4.9.2 The following may be reported:

- Whether or not indentations were detected
- Whether detected indentations were deciphered
- An attachment of developed indentations and decipherments
- Other observations, interpretations, and conclusions, such as the source, date, or sequence of the developed indentations
- If no results are obtained or detected, reporting should use phrases such as "…no indentations were detected using the following methods."
- Limitations to examinations, interpretations or results of examination

4.9.3 Documentation of results and conclusions:

4.9.3.1 When reporting conclusions and interpretations of examination and/or comparisons between one or more items, detailed descriptions of the examinations performed, and how the conclusions were reached must be documented in the analytical notes.

4.10 **Electronic Evidence (Electronic comparisons and Photographs)**

4.10.1 Electronic renditions and notes will be stored in the case file.

4.10.2 Photographs shall be digitally retained by the laboratory.

4.11 **Safety Considerations**

This procedure involves hazardous materials, operations, and equipment. This procedure does not purport to address all the safety issues associated with its use. It is the responsibility of the user of this procedure to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. Proper caution must be exercised, and the use of personal protective equipment must be considered to avoid exposure to hazardous conditions.

Analytical Method #3: Typewriting

1.0 Background/References

1.1 This impact/mechanical printing process method is a guideline to assist in the examination and comparison of typewritten items. There are a wide range of forensic examination that can be conducted as they relate to typewriting. Typewriter examination items include typed documents, typewriters, type elements, and associated components. The examiner may be further assisted by published standards and by appropriate commercial and private references.

1.2 References:

- ANSI/ASB Standard 011: Scope of Expertise in Forensic Document Examination
- SWGDOC G02-13: SWGDOC Standard for Minimum Training Requirements for Examiners
- SWGDOC E04-13: SWGDOC Standard for the Examination of Typewritten Items
- SWGDOC E11-13: SWGDOC Standard for the Examination of Fractured Patterns and Paper Fiber Impressions on Single-Strike Film Ribbons and Typed Text
- Bouffard typewriter classification program
- Wintype typewriter classification program
- Haas Atlas and Interpol reference collection

2.0 Scope

2.1 This analytical method provides procedures used by examiners for examination and comparison of typewritten items. This method includes the comparison of questioned and known items or of exclusively questioned items. The method is dictated by the objectives and by the case-specific material available of the items for examination.

3.0 Equipment/Reagents

- Stereo Microscope
- Hand Magnifier
- Incident, side, and transmitted light sources
- Video Spectral Comparator (VSC)
- Electrostatic Detection Apparatus (ESDA)
- Spacing and Alignment Grids

- Ruler
- Scanner
- Digital Camera
- Adobe Creative Cloud

4.0 Procedure

4.1 Type of examinations, observations, and notes to be recorded in iLIMS.

4.2 Determine whether the type of examination is a comparison between questioned and known items or only questioned items.

4.3 The examiner will conduct a general, visual, and physical examination of the document to determine whether it contains original typed text, nonoriginal text, or both. If the typed text is not original, inquire if the original is available. Examination of the original typed text on the document is preferable.

4.3.1 If the available typed text document is not original, the examiner will assess the quality of the item to determine if:

- the details have sufficient clarity suitable for examination
- the text is a reproduction of original typewriting
- the text is not a reproduction from original typed text

4.3.1.1 Care must be taken for the potential computer-generated copy of a typestyle design.

4.4 **Determination of Document Type and Classification:**

4.4.1 If the questioned item is not original and not suitable for examination, the examiner will discontinue the procedure and report accordingly.

4.4.1.1 If the nonoriginal questioned document is suitable for a limited examination, the examiner will proceed with the procedure to the extent possible.

4.4.2 The submission of a known document will be assessed for quality and suitability for examination and comparison purposes. Like a questioned document submission, original typed text on the known document is preferable. If not suitable, the examiner should inquire and request additional known available items.

4.4.2.1 If the known document is not original and not suitable for examination and no other knowns are available, the examiner will discontinue the procedure and report accordingly.

4.4.2.2 If the nonoriginal known document is suitable for a limited examination, the examiner will proceed with the procedure to the extent possible.

4.4.3 Examination of the text on the typewritten documents include the following class characteristics:

- Typewriter mechanism (e.g. typebar, type wheel, ball element, or thimble)
- Character pitch (e.g. horizontal, vertical, and proportional spacings)
- Longest typewritten line on the document
- Typestyle family (e.g. monotone, courier, and prestige)
- Type character size (e.g. pica and elite)
- Type of ribbon (e.g. fabric, single or multi strike films)
- Correction features (e.g. lift-off, strike-over, or erasure)
- Continuity of typed text

4.4.4 It is best practice for the examiner to utilize a typewriter classification program and reference library to determine, if possible, typed text observations and manufacturer information. Resulting search and reference materials during this phase of the procedure will enable the examiner to obtain additional information regarding preparation of the submitted typewritten item.

4.4.4.1 *Care must be taken and consideration given for the potential interchangeability of elements between compatible machines. For example, if the examiner determines a single element machine is potentially involved, different typestyle design elements, such as courier and prestige, can be used on the same single element machine.*

4.5 **Typestyle Classification**

4.5.1 If the examination is only for a typestyle classification of a questioned document for investigative purposes, the examiner will report the classification results accordingly and may include the following:

- Typestyle family (e.g. monotone, courier, and prestige)
- Character pitch (e.g. horizontal, vertical, and proportional spacings)
- Type character size (e.g. pica and elite)
- Typewriter mechanism (e.g. typebar, type wheel, ball element, or thimble)
- Type of ribbon (e.g. fabric, single or multi strike films)
- Correction features (e.g. lift-off, strike-over, or erasure)
- Typestyle manufacturer
- Possible make and model of typewriters

4.5.1.1 *Care must be taken and consideration given for the completeness of information from a typestyle library. Even with access to a comprehensive reference collection, the examiner will remain cautious with the reporting of results. If non original typed text is examined, there may be limitations for the interpretation of the classification results.*

4.5.2 Examination of the text on the typewritten documents include the following individualizing characteristics:

- Typed character alignment defects (e.g. horizontal, vertical, or rotational)
- If a typebar machine, upper- and lower-case motion defects
- If a single element ball machine, tilt and rotate defects
- Individual typeface character defects

4.5.2.1 *Care must be taken, and consideration given when determining whether the nature of the noted defects are fixed, transient, progressive, and that they can exhibit impression variation.*

4.5.3 Whether the type of examination is questioned to questioned typed text or questioned to known typed text, the examiner will next perform a side-by-side comparison.

4.5.4 Analyzed, compare, and evaluate the individualizing characteristics in the comparable portions of the typed texts.

4.5.4.1 The examiner will determine whether there are differences, similarities, and limitations between the comparable portions of the typed texts and evaluate the typewritten characteristics individually and in combination.

4.5.5 **Interpretation and Documentation of Results**

4.11.5.1 Results will reflect the scope of the examination, strength or shortcomings of the evidence, and limitations of the findings.

- **Identification** - There is agreement in all class and individual characteristics, no significant and inexplicable differences, and no limitations.
- **Elimination** - There are substantial inexplicable differences at any level of the examination and comparison.
- **Qualified conclusion** - There are limitations to the examination and there are noted similarities or differences. Such a conclusion can be appropriate and requires an explanation of the limitations, as they relate to the weight of the findings.
- **No conclusion** - There are significant limitations and the examination reveals no significant differences. Such a conclusion can be appropriate and requires an explanation of the limitations.

4.5.11.2 *Examiners may use similar reporting language referred in the SWGDOC Standard Terminology for Expressing Conclusions of Examiners.*

4.5.12.3 Documentation of results and conclusions:

4.5.12.1 When reporting conclusions and interpretations of examination and/or comparisons between one or more items, detailed descriptions of the examinations performed, and how the conclusions were reached must be documented in the analytical notes.

4.6 **Typewriter Examination (Known Exemplar Creations)**

If a typewriter is submitted, appropriate known exemplars might be obtained.

4.6.1 If a known typewriter is submitted for examination, the examiner will document the following:

- The manufacturer make, model, and serial number
- Condition and any damage of the typewriter and associated components
- Settings of the typewriter (e.g. spacing, margins, seating of single element)
- Ribbon (e.g. fabric, single or multi strike films) and correction media, if equipped
- Typeface defects (single element should be removed for examination)
- Platen impressions or defects
- Any related service records

Care must be taken if the machine is electronic. The examiner will need to become familiar with the machine model for data storage features.

4.6.2 If the submitted typewriter is operable, the examiner will be able to obtain appropriate exemplars as follows:

- Utilize a new comparable ribbon, if possible, for the collection of exemplars.
- Carbon paper may be used in place of ribbon.
- If the ribbon as submitted with the typewriter must be used, clearly designate the start and finish of the exemplar on that portion of the ribbon
- Label all typewritten exemplars to include machine (serial number), examiner, and location information.
- Exemplars should be taken of typewriter with settings as submitted.
- The collection of exemplars will be as comprehensive as possible.
- Exemplars will be created as a sub-item and treated as evidence. New exemplar sub-items will be maintained according to laboratory policy.

4.6.3 If the submitted typewriter is not operable, the examiner may seek permission to correct malfunction, document, and then obtain appropriate exemplars.

4.6.3.1 If available, original normal course-of-business documents produced by the submitted machine at around the same time period of the questioned item would supplement the collection of exemplars.

4.7 **Typewritten Document Dating Examination**:

An examiner may be called upon to examine a questioned typewritten document and its purported date of preparation. The questioned asked is: "Was the typewriter used to prepare the document available prior to the date on the document?" Examination of the questioned typewritten text and other observable features may provide information as to the earliest introduction date of the kind of typewriter as a whole and or related components. The following examinations should serve as a guideline.

4.7.1 Typewriter classification program and reference library to determine, if possible, typed text observations and manufacturer information. Resulting search and reference materials during this phase of the procedure will enable the examiner to obtain additional information regarding preparation of the submitted typewritten item.

4.7.2 If a known typewriter machine and known documents are available for comparison, ribbon condition and typeface cleanliness can be compared between the questioned and known items.

4.8 **Examination of Typewriter Ribbon**:

An examiner may be called upon to carefully handle and examine a typewriter ribbon.

- Single-strike film and paper ribbons and correction components are most commonly readable for decipherment purposes and potentially to associate a used ribbon to typed text on a document.
- It may be possible for a new fabric ribbon with limited usage to contain readable text.

4.9 **Fracture Pattern Examination:**

An examiner may also be called upon to examine the fracture patterns and paper fiber impressions on single-strike typewriter ribbon or lift-off correction tape compared to typed texts on a document. The examiner may be asked: "Can this particular ribbon from the recovered typewriter be associated to the typed text on the questioned document?" The following should serve as a guideline.

4.9.1 Examine the typed text on the document to determine if original.

- If not original typed text, determine if the non-original text is suitable for a limited examination, the examiner will proceed with the procedure to the extent possible.
- If not original typed text, and not suitable for examination, the examiner will discontinue the procedure and report accordingly.

4.9.2 Examine the original typed text on the document to determine if consistent with ribbon class.

4.9.2.1 If the ribbon is multi-strike or fabric, then the examiner will discontinue the procedure and report accordingly.

4.9.3 Examine the typed text on the document to determine if the typestyle is present on the ribbon.

4.9.3.1 Consideration must be given that a ribbon can contain more than one style of type.

4.9.4 Examine the typed text on the document to determine if the text is present on the ribbon.

4.9.5 Examine and determine whether the typed text on the document and the ribbon correspond in all details and corrections.

4.9.6 Examine the typed text on the document and ribbon and determine if fracture patterns of the comparable text are in agreement.

4.9.7 Examine the typed text on the document and ribbon and determine if non transferred print film and void areas of the comparable text are in agreement.

4.9.8 Examine the typed text on the document and ribbon and determine whether impressions of paper fibers on the document and void areas on the ribbon of comparable text are in agreement.

4.9.9 Evaluate the fracture pattern characteristics and limitations both individually and in combination.

4.9.10 **Interpretation and Documentation of Results**

4.9.10.1 Results will reflect the scope of the examination(s), strength or shortcomings of the evidence, and limitations of the findings.

- **Identification** - There is agreement in all class and individual characteristics, no significant and inexplicable differences, and no limitations.
- **Elimination** - There are substantial inexplicable differences at any level of the examination and comparison.
- **Qualified conclusion** - There are limitations to the examination and there are noted similarities or differences. Such a conclusion can be appropriate and also requires an explanation of the limitations as they relate to the weight of the findings.
- **No conclusion** - There are significant limitations, and the examination reveals no significant differences. Such a conclusion can be appropriate and requires an explanation of the limitations.

4.9.10.2 *Examiners may use similar reporting language referred in the SWGDOC Standard Terminology for Expressing Conclusions of Examiners.*

4.9.10.3 Documentation of results and conclusions:

4.9.10.1 When reporting conclusions and interpretations of examination and/or comparisons between one or more items, detailed descriptions of the examinations performed, and how the conclusions were reached must be documented in the analytical notes.

4.10 **Limitations of Examination**

4.10.1 Items submitted for examination can have inherent limitations that can interfere with the procedures in this standard. Limitations should be noted and recorded.

4.10.2 Limitations can be due to submission of nonoriginal documents or condition of the items submitted for examination. Other limitations can come from the quantity or comparability of the material submitted, or from limited individualizing characteristics. Such features are taken into account in this method.

4.10.3 The results of prior storage, handling, testing, or chemical processing (e.g. latent prints) can interfere with the ability of the examiner to see certain characteristics. Whenever possible, document examinations should be conducted prior to any chemical processing. Items should be handled appropriately to avoid compromising subsequent examinations.

4.10.4 Consideration should be given to the possibility that various forms of simulations, imitations, and duplications of typewriting can be generated by computer and other means.

4.11 **Electronic Documentation (Electronic comparisons and Photographs)**

4.11.1 Electronic renditions and notes will be stored in the case file.

4.11.2 Photographs shall be digitally retained by the laboratory.

4.12 **Safety Considerations**

4.12.1 This procedure involves hazardous materials, operations, and equipment. This procedure does not purport to address all the safety issues associated with its use. It is the responsibility of the user of this procedure to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

4.12.2 Proper caution must be exercised, and the use of personal protective equipment must be considered to avoid exposure to hazardous conditions.

Analytical Method #4: Non-Impact Printing Processes

1.0 Background/References

1.1 This analytical method is a guideline to assist in the examination and comparison of items primarily related to toner and liquid ink jet technology. There are wide range of forensic examinations that can be conducted as they relate to toner and liquid ink jet technology. Applicable examination items include non-impact printed documents and related items involving printers, copiers, facsimile machines, and multi-function devices. The procedures within this analytical method may be applicable to documents created by other printing processes. The examiner may be further assisted by published standards and by appropriate commercial and private references.

1.2 References:

- ANSI/ASB Standard 011: Scope of Expertise in Forensic Document Examination
- SWGDOC E05-13: SWGDOC Standard for the Examination of Documents Produced with Toner Technology
- SWGDOC E06-13: SWGDOC Standard for the Examination of Documents Produced with Liquid Ink Jet Technology
- SWGDOC G02-13: SWGDOC Standard for Minimum Training Requirements for Examiners

2.0 Scope

2.1 This analytical method provides procedures used by examiners for examination and comparison of items primarily related to toner and liquid ink jet technology. This method includes the comparison of questioned and known items or of exclusively questioned items. The method is dictated by the objectives and by the case-specific material available of the items for examination.

3.0 Equipment/Reagents

- Stereo Microscope
- Hand Magnifier
- Incident, side, and transmitted light sources
- Graphic Font Ruler
- Spacing and Alignment Grid

- Ruler
- Magnetic detector
- Electrostatic Detection Apparatus (ESDA) and related processing equipment
- Video Spectral Comparator (VSC)
- Scanner
- Digital Camera
- Adobe Creative Cloud/Photoshop

4.0 Procedure

4.1 **Toner Technology Document Examination**

Examinations of documents produced with toner technology, observations, and notes to be recorded in iLIMS.

4.1.1 Determine the type of examination and whether the analysis is a comparison between questioned and known items or only questioned items.

4.1.2 The examiner will conduct a general, visual, and physical examination of the questioned document to determine whether it is produced by toner technology.

4.1.2.1 If not, the examiner will discontinue the procedure and report accordingly.

4.1.3 The examiner will determine whether the questioned document is suitable for examination, comparison, or both. If the document is not suitable, the examiner will discontinue the procedure and report accordingly.

4.1.4 **Known Document Examination**:

4.1.4.1 If a known document is submitted, the examiner will conduct a general, visual, and physical examination of the document to determine if it is suitable for examination, comparison, or both.

4.1.4.2 Care must be taken if the known document is non original. The examiner will need to evaluate the reproduction for sufficient clarity before proceeding.

4.1.4.3 If the known document is not suitable, the examiner will discontinue the procedure and report accordingly.

4.1.5 **Known Toner technology Device Examination:**

If a known toner technology device is submitted, the examiner will examine the device for the submitted condition. The condition of the device can include the following:

- Device capability, features and settings, such as internal memory
- Device platen such as marks or scratches
- Mechanism features
- Paper supply

- Debris and obstructions
- Physical trace evidence such as torn paper fragments within the device mechanisms

4.1.6 **Creation of Exemplars:**

4.6.1.1 The examiner can proceed to obtain exemplars from the device. Exemplars obtained can include the following:

- Test page printouts
- If multi-function device, photocopy printouts
- Exemplars should be comprehensive given the device capabilities and nature of the questioned document
- Exemplars will be created as a sub-item and treated as evidence. New exemplar sub-items will be maintained according to laboratory policy.

4.6.1.2 If available, original normal course-of-business documents produced by the submitted machine at around the same time period of the questioned item would supplement the collection of exemplars.

4.1.6.3 The examiner will conduct a general, visual, and physical examination of the exemplars to determine suitability for comparison purposes.

4.1.7 **Comparison of Toner Technology Documents:**

4.1.7.1 Whether the type of examination is a comparison between questioned and known items or only questioned items, the following will serve as a guideline for class and individualizing features:

- Paper and toner characteristics
- Indentations from the paper transport mechanism
- Font classification (for dating information)
- Device classification of questioned document for potential manufacture information
- Security features
- Individualizing characteristics such as wear, damage, or defects

4.1.7.2 Examine/analyze, compare, and evaluate individualizing characteristics.

4.1.7.3 Determine whether there are differences, similarities, and limitations and evaluate the characteristics individually and in combination.

4.1.8 **Interpretation of Results**

4.1.8.1 Results will reflect the scope of the examinations, strength or shortcomings of the evidence, and limitations of the findings.

- **Identification -** There is agreement in all class and individual characteristics, no significant and inexplicable differences, and no limitations.

- **Elimination -** There are substantial inexplicable differences at any level of the examination and comparison.
- **Qualified conclusion -** There are limitations to the examination and there are noted similarities or differences. Such a conclusion can be appropriate and also requires an explanation of the limitations as they relate to the weight of the findings.
- **No conclusion -** There are significant limitations and the examination reveals no significant differences. Such a conclusion can be appropriate and also requires an explanation of the limitations.

4.1.8.2 Examiners may use similar reporting language referred in the SWGDOC Standard Terminology for Expressing Conclusions of Examiners.

4.2 **Liquid Ink Jet Documents**

Examinations of documents produced with liquid ink jet technology, observations, and notes to be recorded in iLIMS.

4.2.1 Determine the type of examination and whether the analysis is a comparison between questioned and known items or only questioned items.

4.2.2 The examiner will conduct a general, visual, and physical examination of the questioned document to determine whether it is produced by liquid ink jet technology. If not, the examiner will discontinue the procedure and report accordingly.

4.2.3 The examiner will determine whether the questioned document is suitable for examination, comparison, or both. If the document is not suitable, the examiner will discontinue the procedure and report accordingly.

4.2.3 **Known Document Examination**:

If a known document is submitted, the examiner will conduct a general, visual, and physical examination of the document to determine if it is suitable for examination, comparison, or both.

4.2.3.1 Care must be taken if the known document is non original. The examiner will need to evaluate the reproduction for sufficient clarity before proceeding.

4.2.3.2 If the known document is not suitable, the examiner will discontinue the procedure and report accordingly.

4.2.4 **Known Liquid Ink Jet Technology Device**:

4.2.4.1 If a known liquid ink jet technology device is submitted, the examiner will examine the device for the submitted condition. The condition of the device can include the following:

- Device capability, features and settings, such as internal memory
- Device platen such as marks or scratches

- Mechanism features
- Paper supply
- Debris and obstructions
- Physical trace evidence such as torn paper fragments within the device mechanisms

4.2.4.2 The examiner can proceed to obtain exemplars from the device. Exemplars obtained can include the following:

- Test page printouts
- If multi-function device, photocopy printouts
- Exemplars should be comprehensive given the device capabilities and nature of the questioned document
- Exemplars will be created as a sub-item and treated as evidence. New exemplar sub-items will be maintained according to laboratory policy.

4.2.4.3 If available, original normal course-of-business documents produced by the submitted machine at around the same time period of the questioned item would supplement the collection of exemplars.

4.2.4.4 The examiner will conduct a general, visual, and physical examination of the exemplars to determine suitability for comparison purposes.

4.2.5 **Comparison of Liquid Ink Jet Technology Documents:**

4.2.5.1 Whether the type of examination is a comparison between questioned and known items or only questioned items, the following will serve as a guideline for class and individualizing features:

- Paper and liquid ink jet characteristics
- Indentations from the paper transport mechanism
- Font classification (for dating information)
- Device classification of questioned document for potential manufacture information
- Security features
- Individualizing characteristics such as wear, damage, or defects

4.2.5.2 Examine/analyze, compare, and evaluate individualizing characteristics.

4.2.5.3 The examiner will determine whether there are differences, similarities, and limitations and evaluate the characteristics individually and in combination.

4.2.6 **Interpretation of Results**

4.2.6.1 Results will reflect the scope of the examinations, strength or shortcomings of the evidence, and limitations of the findings.

- **Identification -** There is agreement in all class and individual characteristics, no significant and inexplicable differences, and no limitations.

- **Elimination -** There are substantial inexplicable differences at any level of the examination and comparison.
- **Qualified conclusion -** There are limitations to the examination and there are noted similarities or differences. Such a conclusion can be appropriate and also requires an explanation of the limitations as they relate to the weight of the findings.
- **No conclusion -** There are significant limitations and the examination reveals no significant differences. Such a conclusion can be appropriate and also requires an explanation of the limitations.

4.2.6.2 Examiners may use similar reporting language referred in the SWGDOC Standard Terminology for Expressing Conclusions of Examiners.

4.3 **Limitations**

4.3.1 Items submitted for examination may have inherent limitations that can interfere with the procedures in this standard. Limitations should be noted and recorded. Limitations can be due to the generation of the documents, limited quantity or comparability, or condition of the items submitted for examination. Such features are taken into account in this standard.

4.3.2 Prior storage, handling, testing, or chemical processing (for example, for latent prints) may interfere with the ability of the examiner to see certain characteristics. The effects can include, but are not limited to, partial destruction of the paper, stains, and deterioration of the toner.

4.3.2.1 Whenever possible, document examinations should be conducted prior to any chemical processing. Items should be handled appropriately to avoid compromising subsequent examinations.

4.3.2.2 Consideration should be given to the possibility that various forms of manipulation and duplication of toner-produced items can be generated by computer or other means.

4.3.2.3 Some toner supply units are interchangeable between different brands or models of machines. Some toner units are refillable and toner from suppliers other than the original manufacturer may be used.

4.3.3 Some multifunction devices using toner technology can operate in either printing or copying mode, at different resolutions and can produce both multi-color (for example, CYMK) black or monochrome (for example, one color black). These various outputs from one machine have many significant differences among them.

4.4 Electronic Documentation (Electronic comparisons and Photographs)

4.4.1 Electronic renditions and notes will be stored in the case file.

4.4.2 Photographs shall be digitally retained by the laboratory.

4.5 **Safety Considerations**

4.5.1 This procedure involves hazardous materials, operations, and equipment. This procedure does not purport to address all the safety issues associated with its use. It is the responsibility of the user of this procedure to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

4.5.2 Proper caution must be exercised, and the use of personal protective equipment must be considered to avoid exposure to hazardous conditions. Consult the appropriate MSDS/SDS for each chemical prior to use.

Analytical Method #5: Altered Documents

1.0 Background/References

1.1 This procedure is a guideline to assist in the examination of documents suspected of containing alterations. An alteration is a change or modification to a document to include physical, mechanical, chemical or electronic activities. Non-destructive examination techniques are the preferred analytical method used for the detection of an addition, obliteration, substitutions, and other evidence significant to the altered document. The examiner may be further assisted by published standards and by appropriate commercial and private references.

1.2 References:

- ANSI/ASB Standard 011: Scope of Expertise in Forensic Document Examination
- ANSI/ASB Standard 35: Standard for Examination of Documents for Alterations
- ANSI/ASB Standard 44: Standard for Examination of Documents for Indentations
- SWGDOC M01-13: SWGDOC Standard for Test Methods for Writing Ink Comparison
- SWGDOC M03-13: SWGDOC Standard for Non-destructive Examination of Paper
- SWGDOC G02-13: SWGDOC Standard for Minimum Training Requirements for Examiners

2.0 Scope

2.1 This analytical method provides non-destructive procedures used by examiners for examination of documents for alterations.

3.0 Equipment/Reagents

- Stereo Microscope
- Hand Magnifier
- Incident, side, transmitted, and/or filtered light sources
- Graphic Font Ruler
- Spacing and Alignment Grids
- Ruler
- Electrostatic Detection Apparatus (ESDA) and related processing equipment
- Video Spectral Comparator (VSC)
- Scanner

- Digital Camera
- Adobe Creative Cloud/Photoshop

4.0 Procedure

4.1 Examinations, observations, and notes to be recorded in iLIMS.

4.2 The examiner will assess to determine the type and sequence of appropriate non-destructive document examinations.

4.2.1 The submission of the original documents is preferable.

4.2.2 Care must be taken if the document is not original. The examiner will need to evaluate the reproduction for sufficient clarity before proceeding.

4.3 The examiner will conduct applicable non-destructive general, visual, and physical examination of the documents to include observations of the following:

4.3.1 **Handwriting**:

- Obliteration of entries or overwritten entries
- Crowded spacing of written entries
- Inconsistent written entries
- Inconsistent or variation of writing instruments

4.3.2 **Printing processes:**

- Different class of printing processes
- Variation of printing characteristics within printing process
- Physical characteristics such as trash, roller, and picker bar marks
- Variation of fonts, typestyles, spacing, sizes, and formatting
- Irregular placement of printed text
- Other artifacts

4.3.3 **Paper:**

- Physical characteristics such as color changes and optical features
- Folds, perforations, fiber disturbances, and cuts
- Indentations
- Variation of size, opacity, and watermarks

4.3.4 **Fastener characteristics:**

- Different or varying binder techniques
- Staple amount and hole alignment
- Use of adhesives, if removed or absent

- Use and placement of paper clips
- Hole punch and perforation alignment

4.3.5 **Miscellaneous features:**

- Obscuring substances
- Writing or printout smudging
- Document sequence of preparation
- Cut, paste, and substitutions of pages or entries

The examiner will ensure that any materials removed to facilitate document examination techniques are authorized with prior permission and fully documented with image capture of the item.

4.4 Non-Destructive Examinations

The examiner will conduct applicable non-destructive examination of the questioned document and known (if available) that include the following techniques:

4.4.1 Microscopic and optical examinations with various light sources that include transmitted light, oblique lighting, filtered light, ultraviolet (UV), reflected infrared (RIR), and infrared luminescence (IRL)

- Image capture and processing
- Examination for indentations

4.4.2 Other appropriate forensic document examinations (e.g. handwriting comparison) shall be performed subsequent to the resulting non-destructive testing and processing

4.4.3 The examiner will analyze, compare, and evaluate the observed characteristics and findings.

4.4.4 **Interpretation of Results**

4.4.4.1 Results from non-destructive findings will reflect the scope of the examination, strength or shortcomings of the evidence, and limitations of the findings.

- Whether or not there are characteristics of an alteration
- Alteration method or sequence
- Whether or not altered entries are decipherable
- Description of altered and original entries
- Images of altered and original entries

4.4.4.2 Care must be taken if apparent alterations may be the result of normal or legitimate preparation of a document.

4.5 **Destructive Examination:**

4.5.1 The examiner may consider the need for destructive testing of the documents. The presence of obscuring substances may require destructive testing. If not necessary, the examiner will report the results of the non-destructive findings accordingly.

4.5.2 Destructive examination techniques are damaging and will change the document. Such techniques that include the use of chemicals and physical removal of obscuring substances may consume the item and may limit subsequent examinations. They should be considered only after all non-destructive techniques have been completed.

4.5.2.1 The submitting agency will be consulted regarding the potential value and consequences of such techniques.

4.5.2.2 Authorization should be received from the agency in writing prior to use of destructive techniques.

4.6 **Limitations**

4.6.1 Items submitted for examination can have limitations that interfere with the procedures of this analytical method. Limitations can be due to the submission of non-original documents; the condition, quantity, or comparability of the material submitted; or from limited discriminating characteristics.

4.6.2Prior storage, handling, testing, or chemical processing (for example, for latent prints) may interfere with the ability of the examiner to see certain characteristics. The effects can include, but are not limited to, partial destruction of the paper, stains, and deterioration of the toner.

4.6.2.1 Whenever possible, document examinations should be conducted prior to any chemical processing. Items should be handled appropriately to avoid compromising subsequent examinations.

4.7 **Electronic Documentation (Electronic comparisons and Photographs)**

4.7.1 Electronic renditions and notes will be stored in the case file.

4.7.2 Photographs shall be digitally retained by the laboratory.

4.8 **Safety Considerations**

4.8.1 This procedure involves hazardous materials, operations, and equipment. This procedure does not purport to address all the safety issues associated with its use.

4.8.2 It is the responsibility of the user of this procedure to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

4.8.3 Proper caution must be exercised, and the use of personal protective equipment must be considered to avoid exposure to hazardous conditions. Consult the appropriate MSDS/SDS for each chemical prior to use.

Analytical Method #6: Writing Inks

1.0 Background/References

1.1 This method is a guideline to assist in the non-destructive optical examination and comparison of writing ink. While the examiner will not be able to state whether one ink sample is the same as another ink sample, the examiner may be able to differentiate one ink sample compared to another ink sample at this level of analysis. The examiner may be further assisted by published standards and by appropriate commercial and private references.

1.2 References:

- ANSI/ASB Standard 011: Scope of Expertise in Forensic Document Examination
- SWGDOC M01-13: SWGDOC Standard for Test Methods for Writing Ink Comparison
- SWGDOC G02-13: SWGDOC Standard for Minimum Training Requirements for Examiners

2.0 Scope

2.1 This analytical method provides non-destructive optical examination techniques used by examiners for writing ink comparisons. The method is dictated by the objectives and by the case-specific material available of the items for examination.

3.0 Equipment/Reagents

- Stereo Microscope
- Hand Magnifier
- Incident Light
- Oblique Light
- Transmitted Light
- Video Spectral Comparator (VSC)
- Scanner
- Adobe Creative Cloud/Photoshop
- Digital Camera

4.0 Procedure

4.1 Examinations, observations, and notes to be recorded in iLIMS. Photographs and digital records will be electronically stored.

4.1.1 Care must be taken to consider the potential effects and variables of ink interaction on document items. The examiner will need to evaluate how ink interacts with substrates and whether the document was affected by prior handling or storage conditions.

4.2 **Visual examination of the ink**

This is performed using natural, artificial, and other various light sources with or without magnification.

4.2.1 Determine ink classification as to whether the ink is ballpoint or non-ballpoint pen and note the following:

- Overall appearance
- Information that might provide the type of writing or marking instrument
- Reference examples when describing the physical characteristics

4.2.2 Determine the condition of the ink as to whether anything may have caused a change in appearance. The following are some examples:

- Stains
- Fading
- Burns
- Discoloring
- Mechanical erasure
- Destruction by means of a chemical

4.3 **Non-destructive Examination of Ink**

- *Examination of the ink using the VSC and other various light sources with or without magnification.*
- The examiner will follow the VSC operating manual for proper equipment operation.
- For examination of case work: A performance check will be completed with a control test on day of item examination using the VSC. The control results will be recorded in the case notes.
- If the control does not demonstrate proper performance, then troubleshoot and correct using the recommended actions as indicated in the Manufacturers Operation Manual. Any repairs or maintenance completed will be documented in the applicable Instrument Maintenance log.

4.3.1 **Ultraviolet (UV) examination using VSC:**

- Ink fluorescence
- Substrate fluorescence
- Affects to the ink by stains or chemicals
- Detection of other materials such as tapes, adhesives or other opaquing substances

- *Care must be taken to consider the potential effects on the substrate that may affect the ink comparison.*

4.3.5 **Infrared (IR) examination using VSC:**

- Reflected infrared (RIR) - Characteristics are observed by ink opacity or transparency. A four-point scoring scale of -3 (opaque) to 0 (transparent) may be used by the examiner for recording the observations.
- Infrared Luminescence (IRL) - Characteristics are observed of the ink relative to the substrate as being darker, similar, or lighter. A seven point scoring scale of -3 (dark) to 0 (similar) to +3 (lighter) may be used by the examiner for recording the observations.
- It is useful for the examiner to use a range of different light sources, filters, and filter combinations when using the VSC.
- *Care must be taken to consider the amount of ink on the substrate and the appearance of luminescence and non-luminescence of the same ink.*

4.3.6 The examiner will analyze, compare, and evaluate the observed characteristics.

4.3.7 **Interpretation of Results**

4.3.7.1 Results will reflect the scope of the non-destructive examinations, strength or shortcomings of the evidence, and limitations of the findings.

- If significant, reproducible, inexplicable differences are found at **this level of optical analysis**, then it may be concluded the inks compared do not have a common origin.
- If no significant, reproducible, inexplicable differences are found at **this level of optical analysis**, then it may be concluded the inks compared *indicate* a common origin. It is not a definitive conclusion. "Although not conclusive, the results indicate …"
- *The reporting of conclusions should never state that two ink samples are identical or the same ink.*

4.4 Destructive Examination:

4.4.1 The examiner may consider the need for additional destructive testing of the documents. If not necessary, the examiner will report the results of the non-destructive findings accordingly.

4.4.2 Destructive examination techniques are damaging and will change the document. Such techniques that include chemical analysis may consume the item and may limit subsequent examinations. They should be considered and performed only after all non-destructive techniques have been completed.

4.4.2.1 The submitting agency will be consulted regarding the potential value and consequences of such techniques.

4.4.2.2 Approval to conduct destructive testing should be document in writing prior to destructive examination and attached in the case record.

4.5 Electronic Documentation (Electronic comparisons and Photographs)

4.5.1 Electronic renditions and notes will be stored in the case file.

4.5.2 Photographs shall be digitally retained by the laboratory.

4.6 Safety Considerations

4.6.1 This procedure involves hazardous materials, operations, and equipment. This procedure does not purport to address all the safety issues associated with its use. It is the responsibility of the user of this procedure to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. Proper caution must be exercised and the use of personal protective equipment must be considered to avoid exposure to hazardous conditions.

Analytical Method #7: Paper Examination

1.0 Background/References

1.1 This method is a guideline to assist in the non-destructive examination and comparison of paper items to determine whether paper samples originated from the same source. The examiner will physically examine and compare paper samples for similarities and differences at this level of analysis. The examiner may be further assisted by published standards and by appropriate commercial and private references.

1.2 References:

- ANSI/ASB Standard 011: Scope of Expertise in Forensic Document Examination
- SWGDOC M03-13: SWGDOC Standard for Non-destructive Examination of Paper
- SWGDOC G02-13: SWGDOC Standard for Minimum Training Requirements for Examiners

2.0 Scope

2.1 This analytical method provides non-destructive physical examination techniques used by examiners for the examination of paper samples. The method is dictated by the objectives and by the case-specific material available of the items for examination.

3.0 Equipment/Reagents

- Stereo Microscope
- Hand Magnifier
- Incident, side, transmitted, and/or filtered light sources
- Visual Spectral Comparator (VSC)
- Micrometer
- Ruler
- Scale
- Scanner
- Digital Camera
- Adobe Creative Cloud/Photoshop
- Electrostatic Detection Apparatus (ESDA) and related processing equipment

4.0 Procedure

4.1 Examinations, observations, and notes to be recorded in iLIMS.

4.1.1 The examiner will need to assess the submitted items and consider the potential effects of soaked, soiled, stained, charred, torn, and shredded documents. These limitations along with storage conditions involving light, heat, or moisture can make some types of examinations unsuitable.

4.1.2 The analytical method shall be performed when applicable and appropriate. The procedures need not be performed in the order given.

4.2 Determine whether the type of examination is a comparison between questioned and known items or only questioned items.

4.3 Determine whether the paper samples to be compared are suitable for examination and comparison. If not suitable, the examiner will discontinue the method and report accordingly.

4.4 Examine the paper samples with transmitted light and determine if any watermarks are present.

4.4.1 The examiner will need to refer to published industry resources for watermark manufacturer and dating information.

4.5 Examine the paper samples for color characteristics.

4.6 Examine the paper samples with a micrometer and average the thickness of each paper sample at the center and opposite edges.

4.7 Examine the paper samples with ruler for length and width measurements.

4.8 Examine the paper samples for relative weight.

4.9 Examine the paper samples for relative opacity.

4.10 Examine the paper samples for texture and patterns features.

4.11 Examine the corners of the paper samples for the following features:

- Rounded or curved
- Rough
- Square

4.12 Examine the edges of the paper samples for the following features:

- Cutting marks
- Striations
- Coloration
- Orientation

4.13 Examine the paper samples with magnification and light sources that include UV, RIR, and IRL using the VSC. Examine for the following:

- Chemical or contamination
- Alterations
- Carbonless paper transfers
- Binding remnants
- Adhesives
- Padding material
- If printed material present, such as ruled lines and patterns, note spacing and length measurements
- Security features
- Other physical characteristics due to handling, such as folds, creases, fiber disturbances, hole punches, staples, staple hole size and location(s), etc

Note: If it is necessary to remove staples or other attached documents, then permission from the submitter must be obtained and the original condition of the evidence documented (ESDA use recommended).

4.14 Examine the paper samples for indentation evidence.

4.15 The examiner will analyze, compare, and evaluate the observed characteristics.

4.16 **Interpretation of Results**

4.16.1 Results will reflect the scope of the non-destructive examinations, strength or shortcomings of the evidence, and limitations of the findings.

- The paper samples originated from or share the same manufacturer source.
- The paper samples can neither be associated nor disassociated as originating from or share the same source.
- The paper samples did not originate from or share the same source.
- Other evidence that can associate the paper samples, such as indentations or other physical and handling characteristics.

4.17 **Electronic Documentation (Electronic comparisons and Photographs)**

4.17.1 Electronic renditions and notes will be stored in the case file.

4.17.2 Photographs shall be digitally retained by the laboratory.

4.18 **Safety Considerations**

4.18.1 This procedure involves hazardous materials, operations, and equipment. This procedure does not purport to address all the safety issues associated with its use. It is the responsibility of the user of this procedure to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. Proper caution must be exercised and the use of personal protective equipment must be considered to avoid exposure to hazardous conditions.

Analytical Method #8: Physical Match

1.0 Background/References

1.1 This method is a guideline to assist in the examination and physical match of paper items. The question asked is: "Were these paper fragments at one time joined to form a single piece of paper?" The examiner will physically examine and compare paper fragments for similarities and differences at this level of analysis. The examiner may be further assisted by published standards and by appropriate commercial and private references.

1.2 References:

- ANSI/ASB Standard 011: Scope of Expertise in Forensic Document Examination
- SWGDOC Standard for Physical Match of Paper Cuts, Tears, and Perforations in Forensic Document Examinations
- ANSI/ASB Standard 44: Standard for Examination of Documents for Indentations
- SWGDOC G02-13: SWGDOC Standard for Minimum Training Requirements for Examiners

2.0 Scope

2.1 This analytical method provides physical examination techniques used by examiners for the examination of fragmented paper items to determine whether two or more fragments were at one time parts of a single piece of paper. The method is dictated by the objectives and by the case-specific material available of the items for examination.

3.0 Equipment/Reagents

- Stereo Microscope
- Hand Magnifier
- Incident, side, transmitted, and/or filtered light sources
- Imaging equipment
- Electrostatic Detection Apparatus (ESDA) and related processing equipment
- Video Spectral Comparator (VSC)
- Scanner
- Digital Camera

- Adobe Creative Cloud/Photoshop
- Other materials, such as temporary adhesives and clips to aid in examination process

4.0 Procedure

4.1 Examinations, observations, and notes to be recorded in iLIMS.

4.1.1 The examiner will need to assess the submitted items and consider the potential effects of paper that is water soaked, soiled, stained, charred, and finely shredded items. These limitations along with storage conditions and prior handling can interfere with the examination of some characteristics.

4.2 The examiner will determine whether and how the items that are submitted are separated or broken.

4.3 The examiner will determine whether the items can be physically realigned.

4.4 The examiner will evaluate the items for individualizing features and conduct a side-by-side comparison of the items using the following process:

- Visual observation
- Manual arrangement
- Edge-to-edge realignment
- Surface marking characteristics
- Measurements and patterns
- *Care must be taken regarding the preservation of fragile match areas of the submitted paper items for examination.*

4.5 Examine/analyze, compare, and evaluate the observed characteristics individually and in combination.

4.5.1 Interpretation of Results

4.5.1.1 Results will reflect the scope of the examination, strength or shortcomings of the evidence, and limitations of the findings.

- The fragmented paper items were at one time joined to form a single piece of paper.
- Although class similarities were observed, there were insufficient individualizing characteristics to determine whether or not the fragmented paper items were at one time joined to form a single piece of paper.
- The fragmented paper items did not originate from a single piece of paper.

4.5.1.2 *Other subsequent document examinations may be appropriate following the physical match method.*

4.6 **Limitations**

4.6.1 Items submitted for examination may have inherent limitations that can interfere with the procedures in this standard. Limitations should be noted and recorded.

4.6.2 Limitations can be due to limited quantity, comparability, or condition of the items submitted for examination. The condition of a paper sample may make it unsuitable for some types of examinations (for example, items that are water soaked, stained, soiled, charred, or finely shredded paper). Such features are taken into account in this method.

4.6.3 Prior storage, handling, testing, or chemical processing (for example, for latent prints, biological screening, ink analysis) can interfere with the examination of certain characteristics. Whenever possible, document examinations should be conducted prior to any chemical processing. Items should be handled appropriately to avoid compromising subsequent examinations.

4.6.4 In the absence of individual characteristics, it may only be possible to demonstrate an association between two or more items through the commonality of class characteristics.

4.7 **Electronic Documentation (Electronic comparisons and Photographs)**

4.7.1 Electronic renditions and notes will be stored in the case file.

4.7.2 Photographs shall be digitally retained by the laboratory.

4.8 **Safety Considerations**

4.8.1 This procedure involves hazardous materials, operations, and equipment. This procedure does not purport to address all the safety issues associated with its use. It is the responsibility of the user of this procedure to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. Proper caution must be exercised and the use of personal protective equipment must be considered to avoid exposure to hazardous conditions.

Analytical Method #9: Stamping Device Impressions

1.0 Background/References

1.1 This impact/mechanical process method is a guideline to assist in the examination and comparison of stamping device impressions. Stamping devices, such as hand stamps, self-inking stamps, and rotary die stamps come in a wide range of materials, such as rubber, photopolymer, and metal. The examination method focuses on the determination of class and randomly acquired characteristics of stamp impression items. The examiner may be further assisted by published standards and by appropriate commercial and private references.

1.2 References:

- ANSI/ASB Standard 011: Scope of Expertise in Forensic Document Examination
- ANSI/ASB Standard 117: Standard for Examination of Stamping Devices and Stamp Impressions
- SWGDOC G02-13: SWGDOC Standard for Minimum Training Requirements for Examiners

2.0 Scope

2.1 This analytical method provides procedures used by examiners for examination of stamping device impression items. The method is dictated by the objectives and by the case-specific material available of the items for examination.

3.0 Equipment/Reagents

- Stereo Microscope
- Hand Magnifier
- Incident, side, and/or transmitted light sources
- Imaging equipment
- Electrostatic Detection Apparatus (ESDA)
- Video Spectral Comparator (VSC)
- Scanner
- Digital Camera
- Adobe Creative Cloud/Photoshop

4.0 Procedure

4.1 Type of examinations, observations, and notes to be recorded in iLIMS.

4.2 Determine whether the type of examination is a comparison between questioned and known items or only questioned items.

4.3 The examiner will conduct a general, visual, and physical examination of the document to determine whether it contains an original stamp impression. If not original, inquire if the original document is available. Examination of the original stamp impression on the document is preferable.

4.3.1 If the available document is not original, the examiner will assess the quality of the item to determine if the details have sufficient clarity suitable for examination.

4.3.2 *Care must be taken for the potential computer-generated copy of a stamp design.*

4.4 If the questioned item is not original and not suitable for examination, the examiner will discontinue the procedure and report accordingly.

4.5 If the nonoriginal questioned document is suitable for a limited examination, the examiner will proceed with the procedure to the extent possible.

4.6 **Questions Stamp Impressions:**

Examination of the questioned stamp impression will note characteristics of the following:

4.6.1 Class characteristics (i.e. features specific to a general stamp production run)

- Size
- Shape
- Type style design
- Text

4.6.2 Randomly Acquired Characteristics (i.e. features specific to stamp production process or individual usage)

- Cuts
- Gouges
- Impression voids
- Extraneous inking
- Stamp orientation and position

4.7 **Known Items Examination:**

The examiner will use the following procedures when analyzing known stamping device and known impressions.

4.7.1 If a known stamping device is submitted, the following should be noted:

- Name of stamp manufacturer

- Type of stamp (e.g. hand stamp, self-inking)
- Material
- Typeface orientation
- Condition (e.g. clean, worn, dirty, and damage)
- Randomly Acquired Characteristics
- Is ink pad available?

4.7.2 Compare the class characteristics from the known stamping device to the questioned stamp impression. If different class characteristics, the examiner will discontinue the procedure and report accordingly.

4.7.3 The examiner will prepare stamp impression exemplars from the known device. If the ink pad is available, proceed to take exemplars. If the ink pad is not submitted, the examiner should request it.

4.7.3.1 Obtained exemplars suitable for comparison must consider the type of ink (aqueous or oil-based) and substrate similar to that used for the questioned stamp impression. The following are best practices:

- Create first, second, third, and forth generation stamp impressions on initial ink start without re-inking the device
- Use varying angles
- Use varying pressure
- Re-ink and repeat
- *The first impression created will have the heaviest amount of ink. Follow-up impressions created without re-inking will produce progressively less inked impressions.*

4.8 **Known Stamp impression Examination:**

Examination of the known stamp impressions for the following randomly acquired characteristics:

- Cuts
- Gouges
- Impression voids
- Extraneous inking
- Stamp orientation and position

4.9 Whether the type of examination is a comparison between questioned and known items or only questioned items, compare the stamp impressions.

4.9.1 Analyze and evaluate the stamp impressions for comparability. If the stamp impressions are not comparable, discontinue procedure and report accordingly.

4.9.2 The lack of contemporaneous known stamp impressions can affect a meaningful comparison. The submission of known stamp impressions within the same time period of the purported questioned stamp should be requested for a meaningful comparison and results.

4.9.3 The examiner will conduct a side-by-side comparison.

4.9.4 Compare class characteristics for the following:

- Size
- Shape
- Type style
- Text
- Design

4.9.5 Compare randomly acquired characteristics for the following:

- Wear
- Damage
- Blemishes
- Impression voids
- Extraneous inking

4.10 Analyze, compare, and evaluate the observed characteristics of each stamp impression and their significance individually and in combination.

4.11 Interpretation of Results and Reporting

4.11.1 Results will reflect the scope of the examination, strength or shortcomings of the evidence, and limitations of the findings.

- **Identification** - There is agreement in all class characteristics and randomly acquired characteristics, no significant and inexplicable differences, and no limitations.
- **Elimination** - There are substantial inexplicable differences at any level of the examination and comparison.
- **Qualified conclusion** - There are limitations to the examination and there are noted similarities or differences. Such a conclusion can be appropriate and requires an explanation of the limitations as they relate to the weight of the findings.
- **No conclusion** - There are significant limitations and the examination reveals no significant differences. Such a conclusion can be appropriate and also requires an explanation of the limitations.

4.11.2 Examiners may use similar reporting language referred in the SWGDOC Standard Terminology for Expressing Conclusions of Examiners.

4.12 **Electronic Documentation (Electronic comparisons and Photographs)**

4.12.1 Electronic renditions and notes will be stored in the case file.

4.12.2 Photographs shall be digitally retained by the laboratory.

Analytical Method #10: Checkwriter Impressions

1.0 Background/References

1.1 This impact/mechanical process method is a guideline to assist in the examination and comparison of mechanical checkwriters and checkwriter impression items. The examination method focuses on whether a particular checkwriter created an impression, whether two or more impressions can be sourced to the same checkwriter device, or to determine the make and model of the checkwriter that created an impression. The examiner may be further assisted by published standards and by appropriate commercial and private references.

1.2 References:

- ANSI/ASB Standard 011: Scope of Expertise in Forensic Document Examination
- SWGDOC E07-13: SWGDOC Standard for Examination of Mechanical Checkwriter Impressions
- SWGDOC G02-13: SWGDOC Standard for Minimum Training Requirements for Examiners

2.0 Scope

2.1 This analytical method provides procedures used by examiners for examination and comparison of checkwriter items. This method includes the comparison of questioned and known items or of exclusively questioned items. The method is dictated by the objectives and by the case-specific material available of the items for examination.

3.0 Equipment/Reagents

- Stereo Microscope
- Hand Magnifier
- Incident, side, transmitted, and/or filtered light sources
- Video Spectral Comparator (VSC)
- Electrostatic Detection Apparatus (ESDA)
- Scanner
- Digital Camera
- Adobe Creative Cloud/Photoshop

4.0 Procedure

4.1 Type of examinations, observations, and notes to be recorded in iLIMS.

4.2 Determine whether the type of examination is a comparison between questioned and known items or only questioned items.

4.3 Conduct a general, visual, and physical examination of the document to determine whether it was produced by a checkwriter.

4.3.1 If not, the examiner will discontinue the procedure and report accordingly. Examination of the original document is preferable. If not submitted, request the original.

4.3.2 If the submitted questioned document is not original, the examiner will assess the quality of the item to determine suitability:

- The details have sufficient clarity and detail suitable for examination
- The appearance of inking
- Condition of the document

4.3.3 If known checkwriter specimens are submitted and are not original, the examiner will assess the quality of the item to determine suitability:

- The details have sufficient clarity and detail suitable for examination
- The appearance of inking
- Condition of the document

4.3.4 If a known checkwriter is submitted, the examiner will determine:

- Condition of the checkwriter and any visible features
- Whether the known checkwriter can produce suitable exemplar impressions
- If exemplar impressions are not suitable, request known course of business impressions

4.3.5 If the submitted known checkwriter or known course of business impressions are not suitable for comparison purposes, the examiner will discontinue the procedure and report accordingly.

4.4 Whether the type of examination is a comparison between questioned and known items or only questioned items, conduct a side-by-side comparison.

4.4.1 The examiner will compare the class characteristics to include the following:

- Format
- Design of typeface
- Size
- Inking system
- Payee perforator
- Prefix

4.4.2 If different class characteristics are noted, the examiner will discontinue the procedure and report accordingly.

4.4.2.1 Care must be taken that the prefix may be a removable and replaceable feature on certain devices. Perforators may also be inactive on certain devices. It is important to note that a device may contain a custom prefix specific to an individual purchaser/user, which may be unique to that one device.

4.4.3 The examiner will compare the individualizing characteristics to include the following:

- Damage defects
- Blemishes and wear
- Misalignments
- Perforation characteristics
- Impression voids
- Ink voids
- Over inking
- Ink transfer features
- Prefix characteristics

4.5 The examiner will analyze, compare, and evaluate the observed characteristics of the impressions and their significance individually and in combination.

4.5.1 **Interpretation of Results**

4.5.1.1 Results will reflect the scope of the examination, strength or shortcomings of the evidence, and limitations of the findings.

- **Identification** - There is agreement in all class and individual characteristics, no significant and inexplicable differences, and no limitations.
- **Elimination** - There are substantial inexplicable differences at any level of the examination and comparison.
- **Qualified conclusion** - There are limitations to the examination and there are noted similarities or differences. Such a conclusion can be appropriate and requires an explanation of the limitations as they relate to the weight of the findings.
- **No conclusion** - There are significant limitations and the examination reveals no significant differences. Such a conclusion can be appropriate and requires an explanation of the limitations.

4.5.1.2 *Examiners may use similar reporting language referred in the SWGDOC Standard Terminology for Expressing Conclusions of Examiners.*

4.6 Electronic Documentation (Electronic comparisons and Photographs)

4.6.1 Electronic renditions and notes will be stored in the case file.

4.6.2 Photographs shall be digitally retained by the laboratory.

Analytical Method #11: Dry-Seal Impressions

1.0 Background/References

1.1 This impact/mechanical process method is a guideline to assist in the examination and comparison of dry seal devices and dry seal impression items. The examination method focuses on whether a particular dry seal created an impression and whether two or more impressions can be sourced to common device. The examiner may be further assisted by published standards and by appropriate commercial and private references.

1.2 References:

- ANSI/ASB Standard 011: Scope of Expertise in Forensic Document Examination
- SWGDOC E08-13: SWGDOC Standard for Examination of Dry Seal Impressions
- SWGDOC G02-13: SWGDOC Standard for Minimum Training Requirements for Examiners

2.0 Scope

2.1 This analytical method provides procedures used by examiners for examination and comparison of dry seal items. This method includes the comparison of questioned and known items or of exclusively questioned items. The method is dictated by the objectives and by the case-specific material available of the items for examination.

2.2 Care must be taken for the possible duplication of another dry seal.

3.0 Equipment/Reagents

- Stereo Microscope
- Hand Magnifier
- Incident, side, transmitted, and/or filtered light sources
- Video Spectral Comparator (VSC)
- Electrostatic Detection Apparatus (ESDA)
- Scanner
- Digital Camera
- Adobe Creative Cloud/Photoshop

4.0 Procedure

4.1 Type of examinations, observations, and notes to be recorded in iLIMS.

4.2 Determine whether the type of examination is a comparison between questioned and known items or only questioned items.

4.3 The examiner will conduct a general, visual, and physical examination of the document to determine whether it was produced by a dry seal. If not, the examiner will discontinue the procedure and report accordingly. Examination of the original document is preferable and necessary to examine for clarity, detail, level of embossing, condition and for individualizing characteristics. If the original item is not submitted, the examiner should request the original document.

4.3.1 If the submitted questioned document is not original, the examiner will assess the quality of the item to determine suitability:

- The details have sufficient clarity and detail suitable for examination
- The appearance of visible embossing
- Condition of the document

4.3.2 If known dry seal specimens are submitted and are not original, the examiner will assess the quality of the item to determine suitability:

- The details have sufficient clarity and detail suitable for examination
- The appearance of visible embossing
- Condition of the document

4.3.3 Whether the questioned document impression is an original or not, if not suitable for comparison, the examiner will discontinue the procedure and report accordingly.

4.3.4 If a known dry seal device is submitted, the examiner will determine:

- Condition of the device and any visible features
- Whether the known dry seal device can produce suitable exemplar impressions
- If exemplar impressions are not suitable, request known course of business impressions

4.3.5 If the submitted known device or known course of business impressions are not suitable for comparison purposes, the examiner will discontinue the procedure and report accordingly.

4.4 Whether the type of examination is a comparison between questioned and known items or only questioned items, conduct a side-by-side comparison.

4.4.1 The examiner will compare the class characteristics to include the following:

- Impression format
- Size
- Design of typeface
- Other design features

4.4.2 If different class characteristics are noted, the examiner will discontinue the procedure and report accordingly.

4.4.3 The examiner will compare the individualizing characteristics to include the following:

- Damage defects
- Wear
- Embossing variations and patterns

4.5 Analyze, compare, and evaluate the observed characteristics of the impressions and their significance individually and in combination.

4.5.1 Interpretation of Results

4.5.1.1 Results will reflect the scope of the examination, strength or shortcomings of the evidence, and limitations of the findings.

- **Identification** - There is agreement in all class and individual characteristics, no significant and inexplicable differences, and no limitations.
- **Elimination** - There are substantial inexplicable differences at any level of the examination and comparison.
- **Qualified conclusion** - There are limitations to the examination and there are noted similarities or differences. Such a conclusion can be appropriate and requires an explanation of the limitations as they relate to the weight of the findings.
- **No conclusion** - There are significant limitations and the examination reveals no significant differences. Such a conclusion can be appropriate and requires an explanation of the limitations.

4.5.1.2 Examiners may use similar reporting language referred in the SWGDOC Standard Terminology for Expressing Conclusions of Examiners.

4.6 Electronic Documentation (Electronic comparisons and Photographs)

4.6.1 Electronic renditions and notes will be stored in the case file.

4.6.2 Photographs shall be digitally retained by the laboratory.

Analytical Method #12: Charred Documents

1.0 Background/References

1.1 This method is a guideline to assist in the examination and preservation of charred document items. The questioned asked is: "Can this burnt paper or fragments be preserved for investigative information of value?" The examiner focuses on careful approach and preservation techniques. The examiner may be further assisted by published standards and by appropriate commercial and private references.

1.2 References:

- ANSI/ASB Standard 011: Scope of Expertise in Forensic Document Examination
- ANSI/ASB Standard 127: Standard for the Preservation and Examination of Charred Documents
- SWGDOC G02-13: SWGDOC Standard for Minimum Training Requirements for Examiners

2.0 Scope

2.1 This analytical method provides procedures used by examiners for examination and preservation of charred document items. The method is dictated by the objectives and by the case-specific material available of the items for examination.

3.0 Equipment/Reagents

- Stereo Microscope
- Hand Magnifier
- Incident, oblique, transmitted, and/or filtered light sources
- Preservation tools (e.g. tweezers, trays, screen material, bone folder, fine spray device and encapsulation material)
- Humidity chamber
- Video Spectral Comparator (VSC)
- Digital Camera
- Adobe Creative Cloud/Photoshop

4.0 Procedure

4.1 Type of examinations, observations, and notes to be recorded in iLIMS.

4.2 Capture images of the initial condition of the charred items as received.

4.3 The examiner has the discretion to continue the procedure to the extent possible and report accordingly.

4.4 Evaluate the charred items for the following:

- Suitability for preservation
- The condition and level of charring
- If wet, the items will need to dry
- If a single page document, attempt to flatten the document
- If a multi-page or a mass of documents, attempt to separate and flatten each page
- Stabilize and encapsulate the document items

4.4. Depending on the case at hand and condition of the submitted charred documents, careful handling with humidifying, submersing, stabilizing and encapsulation can be appropriate preservation techniques.

4.5 Interpretation of Results

4.5.1 Results will reflect the scope of the examination(s), strength or shortcomings of the evidence, and limitations of the findings.

- Characteristics indicative of charred documents, extent of charring, or determination of source, were observed.
- Any writing, entries, or markings that were decipherable.
- Presence of any text or description of the writing, entries, or markings.
- Description of other materials such as packaging, binding materials, and trace materials.
- Images of the writing, entries, or markings.
- Preservation and packaging method.

4.6 Other examinations may be conducted as required.

4.7 Electronic Documentation (Electronic comparisons and Photographs)

4.7.1 Electronic renditions and notes will be stored in the case file.

4.7.2 Photographs shall be digitally retained by the laboratory.

Analytical Method #13: Liquid Soaked Documents

1.0 Background/References

1.1 This method is a guideline to assist in the examination and preservation of liquid-soaked documents. The questioned asked is: "Can this liquid-soaked document be preserved for investigative information of value?" The examiner focuses on careful approach and preservation techniques. The examiner may be further assisted by published standards and by appropriate commercial and private references.

1.2 References:

- ANSI/ASB Standard 011: Scope of Expertise in Forensic Document Examination
- ANSI/ASB Standard 128: Standard for the Preservation and Examination of Liquid Soaked Documents
- SWGDOC G02-13: SWGDOC Standard for Minimum Training Requirements for Examiners

2.0 Scope

2.1 This analytical method provides procedures used by examiners for examination and preservation of liquid-soaked document items. The method is dictated by the objectives and by the case-specific material available of the items for examination.

3.0 Equipment/Reagents

- Stereo Microscope
- Hand Magnifier
- Incident, oblique, transmitted, and/or filtered light sources
- Preservation tools (e.g. tweezers, trays, screen material, bone folder, fine spray device and encapsulation material)
- Humidity chamber
- Video Spectral Comparator (VSC)
- Scanner
- Adobe Creative Cloud/Photoshop
- Digital Camera

4.0 Procedure

4.1 Type of examinations, observations, and notes to be recorded in iLIMS.

4.2 Images will be captured of the initial condition of the liquid-soaked items as received.

4.3 The examiner has the discretion to continue the procedure to the extent possible and report accordingly.

4.4 Evaluate the liquid-soaked items for the following:

- Suitability for preservation
- Whether wet or dry, the condition and extent from the liquid.
- If document items are received as a wet single page, multi-page or as a mass of documents, attempt to unfold the document, and separate (as needed), without additional damage.
- If document items are received dried as a single page, multi-page or as a mass of documents, attempt to separate (as needed) and flatten the documents without additional damage.
- If document items are received freeze dried, attempt to separate (as needed) and flatten each page.
- If the document thaws, then follow the wet document preservation process.
- Stabilize and encapsulate the document items.

4.4.1 *Depending on the case at hand and condition of the submitted wet or dried documents, careful handling with air drying, freeze drying, humidifying, submerging, or pressing (flattening) can be appropriate preservation techniques.*

4.5 **Interpretation of Results**

4.5.1 Results will reflect the scope of the examination(s), strength or shortcomings of the evidence, and limitations of the findings.

- Characteristics indicative of liquid-soaked documents, method of exposure, or determination of source, were observed.
- Any of the writing, entries, or markings that were decipherable.
- Presence of any text or description of the writing, entries, or markings.
- Description of other materials such as packaging, binding materials, and trace materials.
- Images of the writing, entries, or markings
- Preservation and packaging method

4.6 Other examinations may be conducted as required.

4.7 Electronic Documentation (Electronic comparisons and Photographs)

4.7.1 Electronic renditions and notes will be stored in the case file.

4.7.2 Photographs shall be digitally retained by the laboratory.

Analytical Method #14: Reporting

1.0 Background/References

1.1 This method is .to assist in the general reporting guidelines for cases involving handwriting comparisons. The terminology in this guideline may also be used in reporting interpretations for other forensic document examination cases. Written reports and conclusions must be unbiased and accurately reflect the scope of the examinations, the strength or shortcomings of the evidence, and any limitations of the findings. A summary of the "SWGDOC Standard Terminology for Expressing Conclusions of Forensic Document Examiners" form should be distributed with handwriting examination case reports.

1.2 References:

- SWGDOC Standard Terminology for Expressing Conclusions for Forensic Document Examiners

2.0 Scope

2.1 This analytical method provides suggested wording for opinion terminology and wording which is discouraged in reporting interpretations and conclusions. The method is dictated by the objectives and by the case-specific material available of the items for examination.

3.0 Equipment

3.1 Laboratory Information Management Systems (ILIMS)

4.0 Procedure

4.1 Recommended Terminology for Conclusions

- **identification (definite conclusion of identity)**—this is the highest degree of confidence expressed in handwriting comparisons.
    - The examiner has no reservations whatever, and although prohibited from using the word "fact," the examiner is certain, based on evidence contained in the handwriting, that the writer of the known material actually wrote the writing in question.
    - *Examples*—It has been concluded that John Doe wrote the questioned material, or it is my opinion [or conclusion] that John Doe of the known material wrote the questioned material.

- **strong probability (highly probable, very probable)**—the evidence is very persuasive, yet some critical feature or quality is missing so that an *identification* is not in order; however, the examiner is virtually certain that the questioned and known writings were written by the same individual.
    - *Examples*—There is *strong probability* that the John Doe of the known material wrote the questioned material, or it is my opinion (or conclusion or determination) that the John Doe of the known material *very probably* wrote the questioned material.
    - DISCUSSION—Some examiners doubt the desirability of differentiating between strong probability and probable, and certainly they may eliminate this terminology. But those examiners who are trying to encompass the entire "gray scale" of degrees of confidence may wish to use this or a similar term.

- **probable**—the evidence contained in the handwriting points rather strongly toward the questioned and known writings having been written by the same individual; however, it falls short of the "virtually certain" degree of confidence.
    - *Examples*—It has been concluded that the John Doe of the known material probably wrote the questioned material, or it is my opinion (or conclusion or determination) that the John Doe of the known material *probably* wrote the questioned material.

- **indications (evidence to suggest)**—a body of writing has few features which are of significance for handwriting comparison purposes, but those features are in agreement with another body of writing.
    - *Examples*—There is evidence which *indicates* (or *suggests*) that the John Doe of the known material may have written the questioned material but the evidence falls far short of that necessary to support a definite conclusion.
    - There should always be additional limiting words or phrases (such as "may have" or "but the evidence is far from conclusive") when this opinion is reported, to ensure that the reader understands that the opinion is weak.

- **no conclusion (totally inconclusive, indeterminable)**—This is the zero point of the confidence scale. It is used when there are significantly limiting factors, such as disguise in the questioned and/or known writing or a lack of comparable writing, and the examiner does not have even a leaning one way or another.

- *Examples—No conclusion* could be reached as to whether or not the John Doe of the known material wrote the questioned material, or I could not determine whether or not the John Doe of the known material wrote the questioned material.

- **indications did not**—this carries the same weight as the indications term that is, it is a very weak opinion.
  - *Examples*—There is very little significant evidence present in the comparable portions of the questioned and known writings, but that evidence suggest*s* that the John Doe of the known material did not write the questioned material, or I found indication*s* that the John Doe of the known material did no*t* write the questioned material, but the evidence is far from conclusive.

- **probably did not**—the evidence points rather strongly against the questioned and known writings having been written by the same individual, but, as in the probable range above, the evidence is not quite up to the "virtually certain" range.
  - *Examples*—It has been concluded that the John Doe of the known material probably did not write the questioned material, or it is my opinion (or conclusion or determination) that the John Doe of the known material probably did not write the questioned material.
  - Can also use "It is unlikely that the John Doe of the known material wrote the questioned material." There is no strong objection to this, as "unlikely" is merely the Anglo-Saxon equivalent of "improbable".

- **strong probability did not**—this carries the same weight as strong probability on the identification side of the scale; that is, the examiner is virtually certain that the questioned and known writings were not written by the same individual.
  - *Examples*—There is strong probability that the John Doe of the known material did not write the questioned material, or in my opinion (or conclusion or determination) it is highly probable that the John Doe of the known material did not write the questioned material.
  - May use "highly unlikely" here.

- **elimination**—this, like the *definite conclusion of identity*, is the highest degree of confidence expressed by the document examiner in handwriting comparisons. By using this expression the examiner denotes no doubt in his opinion that the questioned and known writings were not written by the same individual.

- *Examples*—It has been concluded that the John Doe of the known material did not write the questioned material, or it is my opinion (or conclusion or determination) that the John Doe of the known material did not write the questioned material.
- This is often a very difficult determination to make in handwriting examinations, especially when only requested exemplars are available, and extreme care should be used in arriving at this conclusion.

When the opinion is less than definite, there is usually a necessity for additional comments, consisting of such things as reasons for qualification (if the available evidence allows that determination), suggestions for remedies (if any are known), and any other comments that will shed more light on the report. The report should stand alone with no extra explanations necessary.

4.2 **Discouraged wording**

4.2.1 Several expressions occasionally used by document examiners may be troublesome because they can be misinterpreted to: imply bias, lack of clarity, or fallaciousness and their use is deprecated. These expressions include:

- **possible/could have**—these terms have no place in expert opinions on handwriting because the examiner's task is to decide to what degree of certainty it can be said that a handwriting sample is by a specific person. If the evidence is so limited or unclear that no definite or qualified opinion can be expressed, then the proper answer is *no conclusion*. To say that the suspect "could have written the material in question" says nothing about probability and is therefore meaningless to the reader or to the court. The examiner should be clear on the different meanings of "possible" and "probable," although they are often used interchangeably in everyday speech.

- **consistent with**—there are times when this expression is perfectly appropriate, such as when "evidence consistent with disguise is present" or "evidence consistent with a simulation or tracing is present, but "the known writing is consistent with the questioned writing" has no intelligible meaning.

- **could not be identified/cannot identify**—these terms are objectionable not only because they are ambiguous but also because they are biased; they imply that the examiner's task is only to identify the suspect, not to decide whether or not the suspect is the writer. If one of these terms is used, it should always be followed by "or eliminate[d]".

- **similarities were noted/differences as well as similarities**— these expressions are meaningless without an explanation as to the extent and significance of the similarities or differences between the known and questioned material. These terms should never be substituted for gradations of opinions.

- **cannot be associated/cannot be connected**—these terms are too vague and may be interpreted as reflecting bias as they have no counterpart suggesting that the writer cannot be eliminated either.

- **no identification**—this expression could be understood to mean anything from a strong probability that the suspect wrote the questioned writing; to a complete elimination. It is not only confusing but also grammatically incorrect when used informally in sentences such as. "I no identified the writer" or "I made a no ident in this case."

- **inconclusive**—this is commonly used synonymously with no conclusion when the examiner is at the zero point on the scale of confidence. A potential problem is that some people understand this term to mean something short of definite (or conclusive), that is, any degree of probability, and the examiner should be aware of this ambiguity.

- **positive identification**—This phrase is inappropriate because it seems to suggest that some identifications are more positive than others.

- **[strong] reason to believe**—there are too many definitions of *believe* and *belief* that lack certitude. It is more appropriate to testify to our conclusion (or determination or expert opinion) than to our belief, so why use that term in a report?

- **qualified identification**—An *identification* is not qualified. However, opinions may be qualified when the evidence falls short of an *identification* or *elimination*.