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April 17, 2012

Re: Aequitas Solutions, Inc. v. Larry Anderson and Gary P. Lloyd and C Innovation, Inc. Case No. is 7249-ML.
Riley Welch LaPorte & Associates Forensic Laboratories (RWL) Case#12-355016

My name is Gerald M. LaPorte, M.S.F.S., and I am a Forensic Chemist and Document Dating Specialist with Riley Welch LaPorte & Associates Forensic Laboratories. I am currently employed full time as the Forensic Policy Program Manager and Acting Associate Director in the Office of Investigative and Forensic Sciences at the National Institute of Justice, which is within the United States Department of Justice. I have permission to operate as an independent consultant in civil matters and have done so since 2008. My findings and conclusions in this matter do not represent the views of the United States government.

I have over 18 years of experience in the field of forensic science and nearly 11 years of experience performing physical and chemical examinations on a variety of documents to determine how they were produced, where they may have originated from, and whether they are authentic. I trained with the United States Secret Service in the field of questioned document examination, specializing in the area of ink and paper analysis. For more than 6 years, I was responsible for maintaining the largest international collection of writing ink standards in the world – a collection of nearly 10,000 inks that date back to the 1920s. In 2005, I was promoted and designated a "National Expert" by the United States Secret Service in the forensic examination of documents produced using printers and copiers. Prior to my current position, I served as the Chief Research Forensic Chemist in the Forensic Services Division at the United States Secret Service until March of 2009.

I have testified over 65 times in International, Federal, and State courts and have never been excluded as an expert witness. For the past two years, I have served as the co-chair of the Standards Practices and Protocols Interagency Working Group (SPPIWG), which is part of the Office of Science and Technology Policy within the Executive Office of the President of the United States. I am a member of several forensic science professional organizations including the American Academy of Forensic Sciences (AAFS), American Society of Questioned Document Examiners (ASQDE), Mid-Atlantic Association of Forensic Scientists (MAAFS), and American Society of Testing and Materials (ASTM) International. I am also a contributing member in the Scientific Working Group for Questioned Documents (SWGDOC) and have served as a Technical Contact when standards are developed for the questioned document community. I participate in the European Document Examiners Working Group (EDEWG), and I am a contributing member of the International Collaboration for Ink Dating (INCID), an international group dedicated to collaborating on methods for ink dating. I have conducted more than 70 lectures, seminars, and training events in 13 different countries for law enforcement agencies, professional organizations, and technical experts. I have also organized and personally conducted workshop training in the areas of document authentication and ink analysis. I have published several scientific papers in the

area of forensic document examination and authored chapters in the Forensic Chemistry Handbook (*Chemical Analysis Techniques Used in Forensic Document Examinations)* and The Wiley Encyclopedia of Forensic Sciences (*Document Fraud and Forgery*). A copy of my curriculum vitae is included as **Attachment 1**.

QUESTIONED DOCUMENTS

Q1 One (1) "RECORD OF CERTIFICATES ISSUED AND TRANSFERRED" bearing numerous entries ranging from October 2003 through January 2012. This document is referenced hereinafter as the Ledger.

Q2 One (1) "C Innovations, Inc." Common Certificate, dated January 23, 2012. The document bears the number 1 in the top left corner and is in the amount of 15,099 shares as depicted in the top right corner. This document is referenced hereinafter as Certificate 1.

Q3 One (1) "C Innovations, Inc." Common Certificate, dated January 23, 2012. The document bears the number 2 in the top left corner and is in the amount of 15,000 shares as depicted in the top right corner. This document is referenced hereinafter as Certificate 2.

Q4-Q7 Four (4) "C Innovations, Inc." Common Certificates with no additional information. The documents bear the numbers 3, 4, 5, and 6, respectively, in the top left corners of each document. These documents are referenced hereinafter as Certificate 3, Certificate 4, Certificate 5, and Certificate 6, respectively.

Q8 One (1) "C Innovations, Inc." Common Certificate, dated December 15, 2003. The document bears the number 7 in the top left corner, specifies "40% total" in the top right corner, and contains a handwritten note. This document is referenced hereinafter as Certificate 7.

Q9-Q17 Nine (9) "C Innovations, Inc." Common Certificates with no additional information. The documents bear the numbers 8, 9, 10, 11, 12, 13, 14, 15, and 16, respectively, in the top left corners of each document. These documents are referenced hereinafter as Certificate 8, Certificate 9, Certificate 10, Certificate 11, Certificate 12, Certificate, 13, Certificate 14, Certificate 15, and Certificate 16, respectively.

Q18 One (1) "C Innovations, Inc." Common Certificate, dated January 2010. The document bears the number 17 in the top left corner and is in the amount of 99 shares as depicted in the top right corner. This document is referenced hereinafter as Certificate 17.

Q19 One (1) "C Innovations, Inc." Common Certificate, dated January 2010. The document bears the number 18 in the top left corner, is in the amount of 99 shares as depicted in the top right corner, and contains a handwritten note reading "torn" with adjacent initials. This document is referenced hereinafter as Certificate 18.

Q20 One (1) "C Innovations, Inc." Common Certificate, dated January 30, 2008. The document bears the number 19 in the top left corner, is in the amount of 99 shares as

depicted in the top right corner, and contains a handwritten note beginning "Mistake ..." with adjacent initials. This document is referenced hereinafter as Certificate 19.

Q21 One (1) "C Innovations, Inc." Common Certificate, dated January 17, 2008. The document bears the number 20 in the top left corner and a handwritten note. A Transmit Terminal Identification (TTI) header is also present along the left edge and reads "01 11 2008 15:11 9096243491 CINNOVATIONS Page 04".

Q22 One (1) document beginning, "Attention: Cliff Wallace" with no handwritten entries.

Q23 One (1) document beginning, "Attention: Mr. Joe Parisi" bearing a signature in the name of "Larry Anderson".

Q24 One (1) document beginning, "Board Meeting of Prism Prime LLC September 23rd 2003".

Q25 One (1) burgundy colored Corporate Minutes Book labeled "C Innovation Inc.". The book contained six (6) tab pages, but no questioned documents were present.

REQUEST

I was requested by the Plaintiff, Aequitas Solutions Inc., to conduct forensic examinations and testing of the questioned documents to determine whether or not the written entries were created on their purported dates.

EXECUTIVE SUMMARY

Based on a comprehensive forensic document examination and ink dating analysis, most of the Ledger entries and the original written notations on the stock certificates were created contemporaneously and not prepared on their purported dates. There is overwhelming support that the entire Ledger was created on January 23, 2012, or sometime afterwards.

BACKGROUND INFORMATION

I was retained by Barnes and Thornburg LLP and my standard compensation is $450 per hour. On March 30, 2012, I conducted a document inspection at Prince, Yeates & Geldzahler Law Firm, located at 15 West South Temple in Salt Lake City, Utah. Ms. Jennifer Naso, a Forensic Document Examiner from Riley Welch LaPorte & Associates Forensic Laboratories was also present and conducted a separate and independent examination. An examination of this type often requires sophisticated equipment, and it is my understanding that the documents would not be provided to me for examination in my laboratory. Although it is extremely unusual to not be given permission to analyze the documents directly in my laboratory, I made arrangement to have the necessary equipment present at the Law Firm in Salt Lake City, including a stereomicroscope, Video Spectral Comparator (VSC), and an Electrostatic Detection Apparatus (ESDA). Quality control standard specimens were analyzed on the instruments to ensure the equipment was operating correctly. A total of twenty-five different items were provided for the inspection. The Appendix to my report includes all documents that I relied on to form my conclusions.

EXAMINATIONS

I performed a series of physical, optical, and chemical examinations using widely accepted procedures, which are described in the following paragraphs.

Physical Examinations

Physical examinations include non-destructive methods for inspecting the documents visually with an appropriate light source, taking measurements, and viewing it with a stereomicroscope. Stereomicroscopes are used to examine the features of a document at varying degrees of magnification. A stereomicroscope is a binocular microscope capable of blending both eyepiece images, allowing the examiner to discern depth of field. This portion of the examination is necessary to determine how a questioned document was produced and whether any written entries are original (i.e., created with a writing instrument) or reproductions (e.g., photocopied or scanned and printed). At this stage of the analysis, it can be ascertained if there are any other extraordinary observations such as alterations, deletions, obliterations, or watermarks in the paper to possibly identify the manufacturing date.

The text, format, and/or images on documents can be printed using various methods. These methods of production are referred to as printing processes and are identifiable using a magnifying device, such as a stereomicroscope, with an appropriate light source. The most common types of home and office machines utilize toner (e.g., photocopiers, laser printers, and some facsimile machines) or inkjet technology (e.g., inkjet printers and some types of multifunction machines capable of scanning, copying, faxing, and printing). Typically, inkjet ink absorbs into the paper and appears planar, or flat, when visualized with a microscope. Toner consists of a particulate material and sits on top of the paper, which appears to have a three dimensional effect when observed with a stereomicroscope. Both of these technologies are capable of printing in black and/or color. In some instances, the printed material on a document may appear black to the naked eye, but is actually composed of a mixture of colors.

Writing inks can be classified into ballpoint, non-ballpoint (e.g., roller ball, felt tip, gel), and fountain pen inks based on their unique microscopic characteristics that result from the combination of their differential chemical composition and interactions with paper. Determining the type and color of a writing ink is commonly reported following a physical examination and is further described in American Society for Testing and Materials (ASTM) International E1422-05: *Standard Guide for Test Methods for Forensic Writing Ink Comparison.*[1]

Optical Examinations

Optical examinations, also referred to as filtered light examinations, are non-destructive and can provide valuable insight regarding the overall composition of ink and paper. Ink and paper are made from components that respond differently to different wavelengths of light, sometimes in regions of the electromagnetic spectrum beyond what the human eye is capable of seeing. The presence of colorants and other materials will directly affect the manner in which inks and paper

[1] E1422-05: Standard Guide for Test Methods for Forensic Writing Ink Comparison, ASTM International. For Annual Book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website. For referenced ASTM International standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org.

absorb, reflect, and transmit light. Ultraviolet (UV), infrared reflectance (IRR) and infrared luminescence (IRL) illumination are energy sources that can be used to evaluate the properties of an ink. Forensic document examiners commonly use a Video Spectral Comparator (VSC) for this type of examination. The VSC is an instrument equipped with cameras, lights, and filters that allow a forensic document examiner to conduct detailed examinations, while controlling both the wavelength of light being used and the wavelength or region being viewed with the aid of the camera. The VSC was used to assess UV, IRR, and IRL characteristics of the writing inks and paper.

Chemical Examinations

The features of documents—ink, toner, and paper—are chemical compounds that can be analyzed using specialized laboratory equipment. I use two widely-accepted techniques to analyze the features of a document. The first is thin-layer chromatography (TLC), and the second is gas chromatography/mass spectrometry (GC/MS). In order to conduct both TLC and GC/MS, I removed paper and ink plugs (circular discs ranging from 0.5 to 1.0 millimeter in diameter) from representative areas of the questioned document with a specialized device. I then placed the samples in a vial, sealed with a screw top cap, and labeled. The vials remained in my care, custody, and control during my travels back to the Washington, D.C. area and were then secured in my laboratory. I then performed an analysis of the writing ink samples in my laboratory.

A. Thin-Layer Chromatography (TLC)

TLC is a widely used and scientifically accepted method used to characterize chemical mixtures. TLC allows a forensic scientist to separate out different components of a chemical mixture, such as ink. Once these components are separated, they can be analyzed and compared with the components of other chemical mixtures. Inks, for instance, are typically composed of multiple colorants such as dyes and pigments, solvents, and other trace materials. In order to perform TLC on ink, the ink is extracted from the sample plugs. The ink extract is then applied, as a tiny spot, onto a glass plate coated with a white chalk-like silica layer. The TLC plate is then developed with a mixture of solvents. As the plate develops, the solvent mixture then diffuses up the plate by capillary action and carries the ink spot upwards. Each colorant component of the ink will move at different rates along the TLC plate due to their physical and chemical differences, and stop migrating at different points. Once the TLC plate is fully developed, the multiple dye components will appear as a pattern of spots and bands. The separated components can then be compared with the separated components of other ink samples to determine if they match. In the event that inks contain colorant components that separate and migrate identically, the ink formulations are then said to "match" each other as per ASTM International Standard Guide E 1422-05. Note that "match" does not necessarily imply that the two inks came from the same pen or are even the same formula—there are other chemicals in ink that are not detectable using TLC.

This separation and comparison achieved during TLC also provides at least two methods for a forensic examiner to date a writing ink.

One such method is to identify a writing ink that was not commercially available on the purported date of the writing. Since manufacturers are known to change old inks or introduce new ink formulations, it may be determined that an ink formulation was not in production on the purported date of the document. If the pattern of colorants in a sample of ink matches the ink of a particular manufacturer in a reference library of inks, then the ink can be said to come from that manufacturer, and the introductory date may be determined.

Another method is to identify unique chemical dating tags that were knowingly incorporated by two major ink manufacturers in different years. Ink tagging programs have been utilized throughout the 1970s, 1980s, and early 1990s. Another manufacturer began incorporating a chemical dating tag in their ballpoint pens in October of 2002. These tagging components can be detected using TLC.

B. Gas Chromatography/Mass Spectrometry (GC/MS)

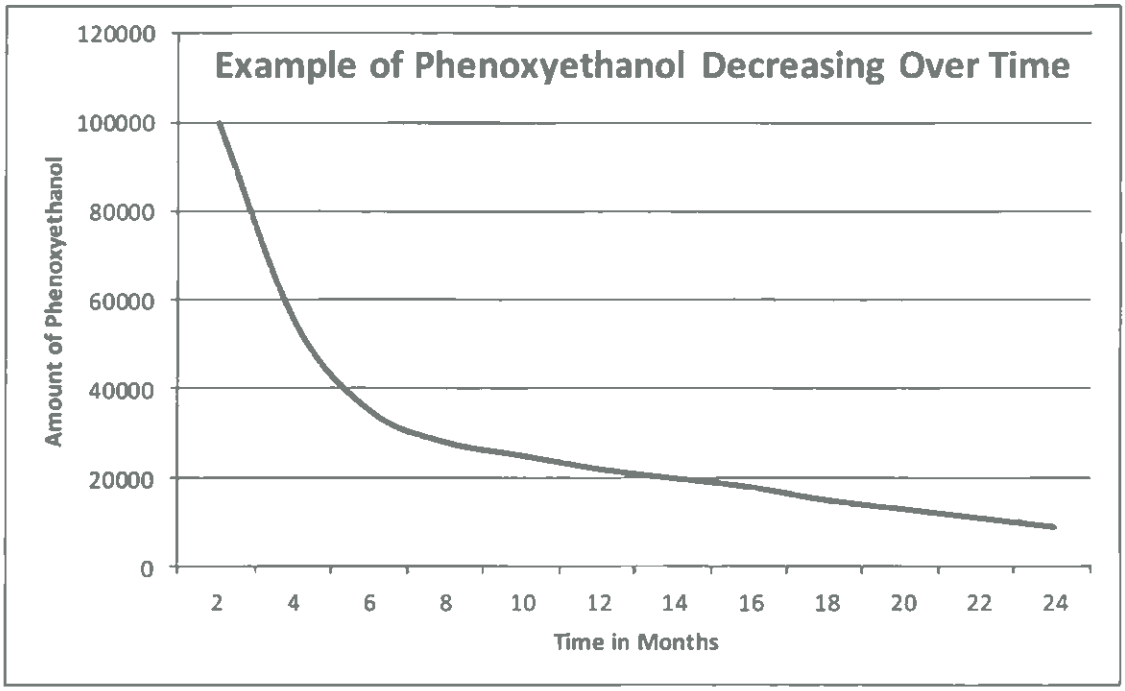
A third procedure that can help authenticate documents is gas chromatography/mass spectrometry (GC/MS). GC/MS is routinely used for chemical analysis in forensic laboratories throughout the world, and is a method that can be used to identify different and specific substances in a test sample. GC/MS has a variety of forensic applications, including: drug detection, fire investigation, environmental analysis, explosives investigation, and the identification of unknown samples.

With respect to ink analysis, GC/MS is used to compare the non-colorant ingredients in inks that are not detectable when analyzed with TLC, such as resins, volatile, and semi-volatile components.[2] Although TLC is an excellent method to characterize the colorant components in an ink formulation, the colorants are only a fraction of the total ink formulation. When an ink is placed on a document, some of the components change as the ink ages. GC/MS can be used to measure these changes.

One well-known change is that the amount of the solvent 2-phenoxyethanol (PE) evaporates as ink ages. A solvent is a chemical that dissolves other materials resulting in a solution; as used in ink, solvents aid in the application of the ink to paper and PE is found in over 85% of blue and black ballpoint writing inks.[3] PE evaporates very quickly when an ink is first placed on paper and then eventually slows, but continues to evaporate in the 24 months after the ink has been placed on the document. After 24 months, PE no longer evaporates at a significant or measurable rate. Figure 1 is a demonstrable representation of how PE ages over a 24 month period.[4]

[2] Bügler JH, Buchner H, Dallmayer A. Characterization of ballpoint pen inks by thermal desorption and gas chromatography-mass spectrometry. J Forensic Sci, 2005; 50(5).
[3] LaPorte G, Wilson J, Cantu A. The Identification of 2-Phenoxyethanol in ballpoint inks using gas chromatography/mass spectrometry. J Forensic Sci, 2004; 49(1).
[4] The graphical representation is intended to depict the theoretical rate of evaporation of PE from an ink because not all inks exhibit the same drying rates.

Figure 1: A demonstrative example of how PE evaporates from an ink over a 24 month period. The rate of evaporation is known to be fast in the early days and months after an ink is placed on paper and then begins to level out over the next several months.



For the purpose of ink dating, GC/MS is used to measure differences in the concentration of PE when samples of the questioned ink are heated and unheated. In this method, samples of the questioned ink are removed from the document, and then one set of the samples is heated and the other set is not. A greater concentration of PE will evaporate from fresh ink compared to older ink when the samples are heated at a temperature of 70 degrees Celsius (70°C). Based on extensive research by forensic laboratories throughout the world including the United States, Russia, Germany, Canada, and Sweden, comparisons with known aged samples, and validation studies, a significant decrease in the level of PE by more than 25% after the questioned sample is heated indicates that the ink is less than two (2) years old. There are factors that may affect the concentration of PE prior to testing such as storage in extreme cold, which slows the ink drying process, or extreme heat, which hastens the ink drying process, but none of these factors would be expected to cause an increase in the level of PE.

Some inks are known to be fast aging where they dry at an extremely fast rate within the first 2 weeks from the time the ink is placed on paper. In a study in 2008, a group from Germany tested 60 ballpoint writing inks and they concluded that 22 (37%) "aged out" within two weeks and the levels of PE remained relatively constant for the next 20 months.[5] Therefore, if an ink loses less than 25% of PE after heating at 70°C then it is not an indication that the ink is older than 2 years – the ink may have fast aging characteristics.

[5] Bügler JH, Buchner H, Dallmayer A. Age determination of ballpoint ink by thermal desorption and gas chromatography-mass spectrometry. J Forensic Sci, 2008; 53(4):982-988.

RESULTS

1. The Ledger was produced using an 8 ½ inch x 11 inch piece of plain white paper. There are five holes punched along the vertical edge and the printing is aligned in the landscape orientation. The text and format features on the document were produced with an office machine system utilizing black toner. These types of systems can include laser printers, photocopiers, and some facsimile machines. The written entries were produced with black ballpoint and blue non-ballpoint writing inks. There are also three red CANCELLED stamps in the rows corresponding to entries for Certificate 7, 19, and 18. No watermarks or other identifying features on the document were observed to determine the first date of manufacture of the paper.
2. Certificates 1 through 6 and 8 through 19 were produced with 8 ½ inch x 11 inch bond paper and each had a watermark reading "[*Line 1*] CAPITOL BOND [*Line2*] 25% COTTON [*Line 3*] 80% POST-CONSUMER. There are five holes punched along the vertical edges and the printing is aligned in the landscape orientation. All of the certificates were printed using a combination of offset lithography and black toner. Certificates 3 through 6 and 8 through 16 are blank, and Certificates 1, 2, 17, 18, and 19 have written entries. Certificates 1, 18, and 19 have a red CANCELLED stamp. The bottom of the certificates also contain a copyright logo with the company name reading, "©1999 CORPEX BANKNOTE CO., BAY SHORE N.Y."
3. An internet search revealed that certificates with the same artwork, formatting, and text are readily available for purchase. In addition, a dry seal and burgundy colored "corporate minutes" book (same as Q25) are also available when purchasing the certificates and is found at the following website: *https://www.markscorpex.com/content.aspx*. An attempt was made to contact the manufacturer of the certificates to determine when the certificates were first available, and if there have been any changes to the artwork, formatting, or the standard pre-printed text. Figure 2 is a comparison of Certificate 1 and a certificate found on the internet.

Figure 2: The same artwork, formatting, and text are found on Certificate 1(left photograph) compared to a certificate that can be purchased currently on the internet (right photograph).

Certificate 1 | Certificate available online

4. Certificate 7 is a non-original document that was produced with black toner. A handwritten note beginning, "Original was given to John Uhler …" is written in black ballpoint ink along the left portion of the document. Certificate 7 also contained an original red CANCELLED stamp. Moreover, Certificate 7 is formatted differently such that there are two signature lines in the lower right and lower left positions. Since this is not an original document, there is no way to determine if the extra signature lines were pre-printed on the original document or if they were added at some time afterwards. All of the other certificates only had 1 signature line on each side. Figure 3 shows the formatting differences Certificate 7 when compared to all the other certificates.

Figure 3: There are two signature lines in each of the lower portion of Certificate 7 (left photograph) compared with all the other certificates, which had a single line on both sides. The right photograph is a demonstrative example using Certificate 17.

5. Certificate 20 is a non-original document that was produced with black toner. This certificate also contains a Transmit Terminal Identification (TTI) header along the vertical edge that reads "*01 11 2008 15:11 9096243491 CINNOVATIONS Page 04*". The TTI provides information about the document when transmitted via facsimile. It appears that at least four documents were sent during this transmission, but no other related documents to Certificate 20 were presented for inspection. Also, according to the internal clock on the facsimile machine, Certificate 20 was faxed at 15:11 on January 11, 2008, but the document was dated January 17, 2008.

6. Based on the TLC analysis, the following is a summary of the different writing inks that were used on all of the documents.[6] Each ink has been designated a letter (e.g., Ink A, Ink B, Ink C) to distinguish the different ink formulations.

   A. Ink A is a group of black ballpoint inks that were determined to match each other. This ink matched an ink obtained from a promotional pen, but the exact manufacturing date was not available. No chemical dating tags were identified to determine the first date of manufacture. This ink was used for entries that spanned from 2003 through 2010 indicating that the entries may have been created contemporaneously. Further GC/MS testing was conducted to determine the age of some of these entries, which is discussed in the following **Ink Dating Analysis** section.

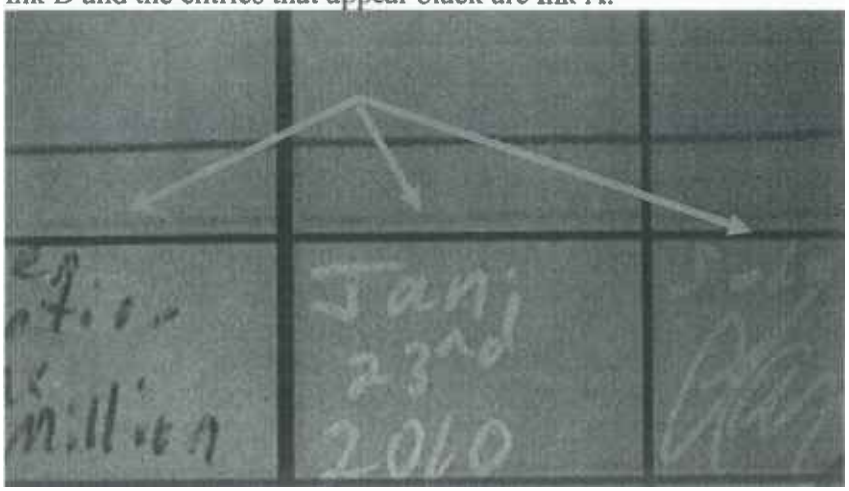
[6] Red writing ink was used for a note on Certificate 1, but was not tested because there were no other red inks present on any of the questioned documents for comparison.

Table 1: Black ballpoint writing inks designated as Ink A.

Questioned Document	Description of Entry	Purported Date of Entry
Q1 – Ledger	Entry 1 at the top of the Ledger beginning: "Paul turned over book…"	October 2003
Q1 – Ledger	Entry on the Ledger that corresponds to Certificate 1 (Certificate 1 row)	Corresponds to Nov 2003
Q1 – Ledger	Entry on the Ledger that corresponds to Certificate 19 (Certificate 19 row)	January 2010
Q1 – Ledger	Entry on the Ledger that corresponds to Certificate 18 (Certificate 18 row)	January 2010
Q1 – Ledger	Entries on the Ledger that correspond to Certificate 17. The entries in the row were created with two different inks. Ink A was used for the first seven column entries up to the "Amount Paid Thereon" column. See **Figure 4**.	January 2010
Q8 – Certificate 7	Non-original document with handwritten note beginning, "Original given to John Uhler…"	Undated Note, but Certificate is dated December 15, 2003

Figure 4 below depicts the difference in the infrared luminescence (IRL) characteristics of the writing inks used in the Ledger for the entries in the same row corresponding to Certificate 17. A different ink, Ink D, was used to create the entries corresponding to Certificate 17 beginning at the column titled "Date" followed by a signature. This is different than Ink A, which was used for the preceding entries in the same row.

Figure 4: An image of the infrared luminescent characteristics of the different inks used for entries on the Ledger that correspond to the row for Certificate 17. The entries with the "white glow" are Ink D and the entries that appear black are Ink A.



B. Ink B is a black ballpoint ink. A comparison with standards revealed that Ink B originates from a "root" formulation of ink first manufactured in 1979 by the Bic Corporation and is still widely available in many writing instruments from various manufacturers. No chemical dating tags were identified to determine the year of manufacture. Although this ink was used for the entries

corresponding to Certificate 7 in the Ledger, it did not match the black ink (Ink A) used for the note on Certificate 7 beginning, "Original note given to John Uhler ..." Further GC/MS testing was conducted on some of these entries, which is discussed in the following **Ink Dating Analysis** section.

Table 2: Black ballpoint writing ink designated as Ink B.

Questioned Document	Description of Entry	Purported Date of Entry
Q1 – Ledger	Entry for Certificate 7	Corresponds to December 2003

C. Ink C is a group of black ballpoint inks that were determined to match each other. The manufacturer of this ink was not identified, and no chemical dating tags were identified to determine the year of manufacture. Therefore, no conclusion can be reached regarding the availability of this ink. Ink C was used for entries that spanned from 2003 through 2008 indicating that the entries may have been created contemporaneously. Further GC/MS testing was conducted on some of these entries, which is discussed in the following **Ink Dating Analysis** section.

Table 3: Black ballpoint writing inks designated as Ink C.

Questioned Document	Description of Entry	Purported Date of Entry
Q1 – Ledger	Entry for Certificate 20	Corresponds to Jan 17, 2008
Q23	Signature	Undated
Q24	Signature	September 23, 2003

D. Ink D is a group of black ballpoint inks that were determined to match each other. A comparison with standards revealed that Ink D matches a Papermate pen, which is a root formulation of ink first manufactured in 1979 by the Bic Corporation and is still widely available in many writing instruments from various manufacturers[7]. This ink was used for entries that spanned from 2003 through 2010 indicating that the entries may have been created contemporaneously. Further GC/MS testing was conducted on some of these entries, which is discussed in the following **Ink Dating Analysis** section.

Table 4: Black ballpoint writing inks designated as Ink D.

Questioned Document	Description of Entry	Purported Date of Entry
Q1 – Ledger	Partial entries on the Ledger that correspond to Certificate 17. The entries in the row were created with two different inks. Ink D was used for the Date and Signature and Ink A was used for the first seven column entries up to the "Amount Paid Thereon" column. **See Figure 4.**	January 23, 2010
Q19 – Certificate 18	All Written entries	January 2010
Q20 – Certificate 19	All Written entries	January 2008 (reported as a mistake)

[7] It is possible that this ink matches other formulations from different manufacturers since there are several variations, which contain the same combination of colorants.

E. Ink E is a group of blue non-ballpoint inks that were determined to match each other. The blue non-ballpoint inks on the Ledger were pigment-based and did not extract fully for sufficient TLC analysis. Further GC/MS testing was conducted on some of these entries, which is discussed in the following **Ink Dating Analysis** section.

Table 5: Blue non-ballpoint writing inks designated as Ink E.

Questioned Document	Description of Entry	Purported Date of Entry
Q1 – Ledger	Entry on Ledger following Certificate 1 beginning "#1 canceled …" with a hand drawn line	Undated
Q1 – Ledger	Entry for Certificate #2	January 2012
Q2 – Certificate 1	Written Note on Certificate 1	Undated

F. Ink F is a group of blue non-ballpoint[8] inks that were determined to match each other. No chemical dating tags were identified to determine the first date of manufacture. No attempt was made to identify the manufacturer since the entries were dated January 23, 2012.

Table 6: Blue non-ballpoint writing inks designated as Ink F.

Questioned Document	Description of Entry	Purported Date of Entry
Q2 - Certificate 1	All written entries except Note	January 23, 2012
Q3 – Certificate 2	All written entries	January 23, 2012

G. Ink G is a blue non-ballpoint ink. No chemical dating tag was identified to determine the first date of manufacture. No attempt was made to identify the manufacturer since the entry was dated January 2010.

Table 7: Blue non-ballpoint writing ink designated as Ink G.

Questioned Document	Description of Entry	Purported Date of Entry
Q18 – Certificate 17	All written entries	January 2010

Ink Dating Analysis using Gas Chromatography/Mass Spectrometry (GC/MS)

Dating of 2003 and 2010 Ink A Ledger Entries

I was able to perform GC/MS testing on representative samples taken from the writing inks on some of the questioned documents on April 1, 2012. Using Ink A, I considered the entries in the Ledger that correspond to Certificates 17, 18, and 19 as a single group because they were all dated January 2010. However, as noted in the aforementioned section, Ink A and Ink D were both used in the same row on the Ledger that corresponds to Certificate 17, but for the purpose of this specific analysis, only the Ink A entries were used. Moreover, I selected entries that were dated over a significantly long period and were determined to match each other because using a single formulation of writing ink for entries that are dated years apart may be indicative of

[8] The blue non-ballpoint inks on Certificate 1 and 2 could not be differentiated optically, were dated the same, and were therefore considered a single group. TLC analysis was conducted on representative samples from Certificate 1.

contemporaneous preparation. Therefore, I conducted an ink dating analysis on Entry 1 at the top of the Ledger (Ink A) beginning, "Paul turned over Book ..." and the Ink A entries that correspond to Certificate 17 in the Ledger, which was the second last line in the Ledger. The reason I conducted separate analyses on the Ink A entries from 2003 and 2010 is that these inks would be expected to exhibit different aging characteristics if they were in fact placed on the Ledger seven years apart. Moreover, the written entries in the 2010 row were composed of different inks (Ink A and Ink D) indicating that the entire row of entries was not completed at the same time.

In the first instance, the GC/MS is run at its broadest setting, "Full Scan" mode, which provides a proportional overview of the compounds in the ink. During this stage of my testing, I observed that the levels of 2-phenoxyethanol (PE) in the Entry 1 at the top of the Ledger, dated 2003 (Ink A) and the Ledger entry for Certificate 17, dated 2010 (Ink A) were proportionally high and far exceeded levels of PE in a writing ink purported to be more than 2 years old. Given that the initial testing revealed extremely high levels of PE, I ran a second GC/MS analysis, using "Selective Ion Monitoring," or SIM mode, in order to accurately measure the amount of PE. SIM mode can increase sensitivity by a factor of 10-100 times that of the full scan mode, and therefore provides more specific results.

After running the GC/MS analysis in SIM mode, I confirmed that the level of PE in the 2003 and 2010 entries were in fact, unusually high, especially for entries purported to be over 8 years old and 2 years old, respectively. As discussed above, the amount of PE in a sample of unheated ink can be compared with the amount of PE in a sample of ink that has been heated in order to date the ink. If an ink is "dry" (older than 2 years) then the heating should have little effect on the amount of PE lost. If an ink is "fresh" (younger than 2 years) then the heating will cause a large percentage of PE to be removed from the ink. As described previously, a loss of PE of 25% or more indicates that an ink is less than two years old. In this case, testing on the 2003 and 2010 entries resulted in an average loss of 71% of PE, a level that far exceeds the 25% threshold. The level of PE in the initial round of samples and the amount of PE that was "evaporated" from the ink samples after being heated have been some of the highest levels I have observed in casework analysis.

I conducted an additional PE analysis on April 12, 2012 on the ink used for the handwritten note on Certificate 7 (Ink A) beginning, "Original given to John Uhler...". Once again, the initial levels of PE were extremely high. There was a 46% loss of PE when the levels from the unheated samples were compared with the heated samples. Since there was an average loss of 71% of the Ink A samples nearly two weeks prior, this is a strong indicator that the ink is still in the initial stages of drying.

Dating of Ink B Entries on the Ledger

The entries in the second row on the Ledger that correspond to Certificate 7 (Ink B) were analyzed on April 12, 2012. The initial levels of PE were extremely high and the PE testing resulted in a 53% loss, which is more than 2 times the threshold level of 25%, indicating that the entries in the second row of the Ledger were not created on their purported date. The date on Certificate 7 is December 15, 2003.

Corroborative Findings for Other Ink A Entries

Ink A was also used for entries in the Ledger that correspond to Certificate 18 (January 2010), Certificate 19 (January 2010), Certificate 1 (Corresponds to November 2003), and the undated note

on Certificate 7. Since the entries for Certificate 1, which correspond to November 2003, were created with Ink A, indicating that the entries may have been created contemporaneously with other 2010 entries, a separate GC/MS analysis was conducted. The results revealed an extremely high level of 2-phenoxyethanol in the first line of entries in the Ledger for Certificate 1, similar to the October 2003 and January 2010 entries discussed above.[9]

Associative Findings for Ink D Entries

One very important consideration is that the entries in the row on the Ledger that correspond to Certificate 17 were created with Ink A and Ink D. Ink D was used for the date and signature, which follows the Ink A entries. Assuming that the Ink D entries were written after the Ink A entries then this would indicate that the Ink D entry was not created in January 2010 either. Furthermore, Ink D was also used to sign and date Certificate 18 (dated January 2010) and Certificate 19 (dated January 2008). Certificate 18 contained a written note reading "Torn" with initials and Certificate 19 contained a written note reading "Mistake on date on dated line" with adjacent initials. This evidence indicates that the entries for Certificate 19, Certificate 18, and the latter entries for Certificate 17 in the Ledger were created contemporaneously, but not on their purported dates of January 2010.

The left signature on Certificate 19 was analyzed on April 12, 2012, nearly two weeks after the first round of testing on April 1, 2012 and the initial levels of PE were extremely high. Further PE testing revealed a 4% loss when the unheated samples were compared to the heated samples. As stated previously, a PE loss of less than 25% is not evidence that an ink is more than 2 years old. This simply could mean that Ink D is a "fast aging" ink.

GC/MS Findings for Ink C

The inks used for the Ledger entries corresponding to Certificate 20 and the signature on the Board Minutes (Ink C) were analyzed using GC/MS and could not be further differentiated. The PE levels in the inks were proportionally similar, but there were not sufficient samples for further dating tests.

GC/MS Findings for Ink E (Blue Non-Ballpoint)

A GC/MS analysis was also conducted on the two blue non-ballpoint ink entries on the Ledger and these inks contained nearly identical non-colorant components indicating that both entries were created in 2012 and the entry beginning, "#1 canceled …" was not placed in chronological order on the Ledger.

Stamp Examination

A red "CANCELLED" stamp was used seven times on the documents as follows: i) the Ledger entries for Certificate 7, 19, and 18; ii) Certificate 1; iii) Certificate 7; iv) Certificate 18; and v) Certificate 19. Stamp impressions can impart "defects" in the inked portion on a document. Defects are defined as an unintentional marking or imperfection that is transferred onto a document during the transfer of ink. The imperfections can often be visualized by means of a macroscopic or microscopic examination of the image areas of the stamp. Defects due to excess ink and/or abrasions on the stamp face can impart class characteristics to indicate that the same stamp was

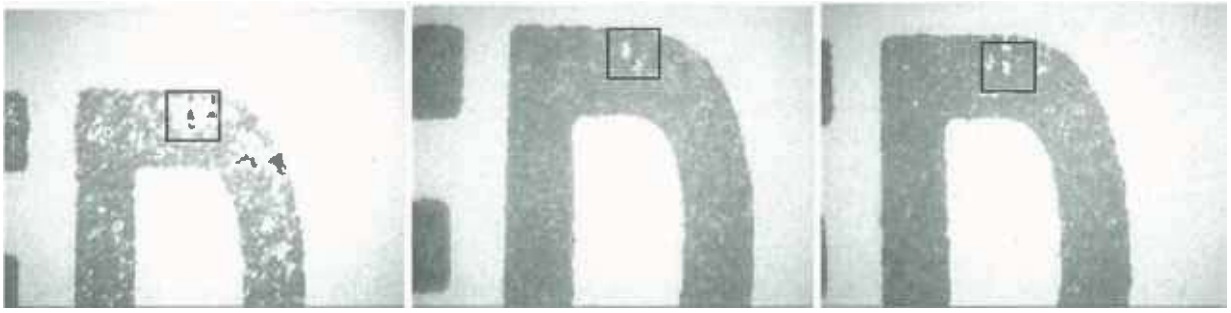
[9] Further PE testing could not be conducted on the entries that correspond to Certificate 1 on the Ledger because I did not have additional ink plugs sufficient for testing.

used. It was determined that the red CANCELLED stamp from the three ledger entries, Certificate 18 and Certificate 19 had a repeating defect in the same position in the letter "D". The stamp on Certificate 1 had a defect in the same area, but it was not fully covered in ink and therefore limited the interpretation. The defect was not evident in Certificate 7. Figure 5 illustrates the defect in the top portion of the letter "D".

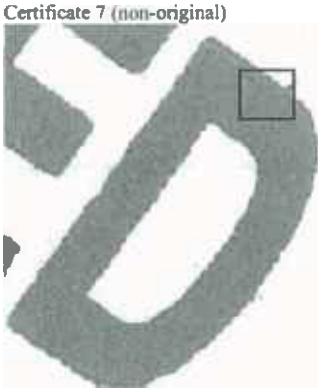
Figure 5: Photographic images of a defect that occurs in the same position of the "D" in the red CANCELLED stamp, but does not appear in the stamp used on Certificate 7 (non-original copy).

Ledger Entry for Certificate 7 (dated Dec 2003) Ledger Entry for Certificate 18 (dated Jan 2010) Ledger Entry for Certificate 19 (dated Jan 2010)

Certificate 1 Certificate 18 Certificate 19



Certificate 7 (non-original)



Inconsistencies Between Writing Inks on the Certificates and Writing Inks in the Ledger Corresponding to the Certificates

I observed inconsistencies in the writing inks used directly on the Certificates when compared with the writing inks used on the Ledger that correspond to the Certificates. **Table 8** provides a summary to demonstrate that the writing inks used in the endorsement sections of the Certificates

are not the same as the ink used for the corresponding Ledger entry. As well, there appears to be numerous errors and cancellations, which are also noted.

Table 8: A summary of the inconsistencies found in the inks used on the Certificates and for the respective entries in the Ledger. The "Other Findings" category highlights numerous errors and cancellations.

Certificate Number	Ink Formulation used for Ledger Entries	Ink Formulation used for Entries on the Certificate	Other Findings
Entry at top of Ledger	Ink A	NA	NA
1	Ink A (November 2003) Black Ballpoint	Ink E (Note)/Ink F(Written share information) Blue Non-Ballpoint	Cancelled on Certificate 1, but not in Ledger
1	Ink E (Added Note) Blue Non-Ballpoint	Ink E (Note)/Ink F (Written share information) Blue Non-Ballpoints	Same as Ink E, which was used for the January 2012 Ledger entry for Certificate 2
7	Ink B Black Ballpoint	Ink A (Note) Black Ballpoint	Non-original and Cancelled; stamp in Ledger is different than stamp on Certificate
20	Ink C Black Ballpoint	No original written entries	Non-original and dated Jan 2008 – same as mistaken date on Certificate 19 Ink C also used on Q23 and Q24
19	Ink A Black Ballpoint	Ink D Black Ballpoint	Mistaken date of January 2008 and Cancelled
18	Ink A Black Ballpoint	Ink D Black Ballpoint	Torn and Cancelled
17	Ink A/Ink D Black Ballpoint	Ink G Blue Non-Ballpoint	N/A
2	Ink E Blue Non-Ballpoint	Ink F Blue Non-Ballpoint	N/A

CONCLUSIONS

Based on full consideration of the findings from the forensic examination of the questioned documents, some of the original written notations on the stock certificates and most of the Ledger entries were not created on their purported dates.[10] The following conclusions provide overwhelming support that it is much more likely that the entire Ledger was created on January 23, 2012, or sometime afterwards:

1. A. It is highly probable[11] that the inks used to produce Entry 1 at the top of the Ledger reading, "*Paul turned over book it has 20 blank share certificates in Book [undecipherable initials] Oct 2003*" and the written notations up to the "AMOUNT PAID THEREON" column in the Ledger that correspond to Certificate 17 were not placed on the document in October 2003 and January 2010, respectively. The amount of PE detected in the samples during the first GC/MS analysis was extremely high, which is indicative of a "fresh" ink. After conducting the second round of testing, the amount of PE decreased an average of 71% in duplicate trials when the unheated samples were compared with the heated samples. This far exceeds the baseline value of 25%, which is used to indicate that an ink is younger than 2 years. The level of PE in the initial round of samples and the amount of PE that was "evaporated" from the ink samples after being heated were some of the highest levels I have observed in casework analysis.

   B. It is highly probable that the writing ink used for the handwritten note on Certificate 7 (Ink A) beginning, "Original given to John Uhler…" was not placed on the document in January 2010. An additional PE analysis revealed a 46% loss nearly two weeks after the first round of testing. When compared to the Ink A entries discussed above (71% loss), Ink A is still in the initial stages of drying.

   C. It is highly probable that the ink used to produce the entries in the Ledger that correspond to Certificate 7 were not placed on the document in December 2003. The amount of PE detected in the samples during the first GC/MS analysis was extremely high, which is indicative of a "fresh" ink. After conducting the second round of testing, the amount of PE decreased an average of 53% when the unheated samples were compared with the heated samples.

   D. GC/MS analysis revealed an extremely high level of 2-phenoxyethanol in the Ledger entry that corresponds to Certificate 1 (November 2003). The level of PE was associated with similar levels found in Entry 1 at the top of the Ledger reading, "*Paul turned over book it has 20 blank share certificates in Book [undecipherable initials] Oct 2003*" and the written notations up to the "AMOUNT PAID THEREON" column in the Ledger that correspond to Certificate 17.

[10] A definitive conclusion could not be reached regarding some of the entries and documents, which are explained in Conclusions 8 through 10.

[11] The forensic document community relies on ASTM E1658-08: Standard Terminology for Expressing Conclusions of Forensic Document Examiners. "Highly Probable" is used to describe evidence that is very persuasive and the examiner is virtually certain, but there is some factor that precludes the examiner from reaching an absolute certainty degree of confidence.

2. It is highly probable that the entire Ledger of entries from Entry 1 through the entries that correspond to Certificate 17 were written contemporaneously on or after January 23, 2012. The very first entry on the Ledger and the entries that Correspond to Certificate 17 represent a chronological timeline of entries. Given that it is highly probable that these entries and some of the entries in between were not created on their purported dates, it is logical to deduce that they were all created in a contemporaneous time frame. Moreover, the final entry on the Ledger was created with blue non-ballpoint ink and no conclusion could be reached as to whether or not the entries were created on January 23, 2012 at 10 am. Therefore, the January 23, 2012 entries serve as a "starting" point because they are the first row of entries where a conclusion could not be reached with respect to the purported date of preparation.

3. A. The entire row of entries in the Ledger that corresponds to Certificate 17 was not created at the same time because two different inks were used (Ink A and Ink D).

   B. Assuming that the Ink D entries were written after the Ink A entries in the Ledger that correspond to Certificate 17, then it is highly probable that the date and signature in the Certificate 17 line in the Ledger were not placed on the Ledger in January 2010.

4. It is probable[12] that, as a group, all of the Ink A and Ink D entries were created contemporaneously. This includes all written entries for Certificate 17, 18, and 19 on the Ledger (dated January 2010); Entry 1 at the top of the Ledger (dated October 2003); the entry that corresponds to Certificate 1 on the Ledger (dated November 2003); and the written entries on Certificate 18 (dated January 2010) and Certificate 19 (dated January 2008). This is based on the "cross-use" of Inks A and D on the Ledger and the Certificates, the matching ink formulations, the GC/MS results, and the ink dating tests for 2-phenoxyethanol.

5. There are indications[13] that the entries produced with the blue non-ballpoint ink in the last row of the Ledger, dated January 2012 and the blue ink between the Certificate 1 and 7 entries on the Ledger were created contemporaneously. These inks could not be differentiated based on TLC and GC/MS.

6. There are indications that the CANCELLED stamp on Certificate 7 was not placed contemporaneously with the other 6 CANCELLED stamps, including the CANCELLED stamp that corresponds to Certificate 7 in the Ledger. The stamp on Certificate 7 did not contain the same defect in the "D" that appeared in 5 of the other stamps.

7. There is an inconsistency in the facsimile date in the TTI on Certificate 20 (dated January 11, 2008), which does not correspond to the date the Certificate was signed (January 17, 2008) because the fax transmission pre-dates the signature date on Certificate 20.

[12] The forensic document community relies on ASTM E1658-08: Standard Terminology for Expressing Conclusions of Forensic Document Examiners. "Probable" is used to describe evidence that points rather strongly, but the examiner is not virtually certain.

[13] The forensic document community relies on ASTM E1658-08: Standard Terminology for Expressing Conclusions of Forensic Document Examiners. "Indications" is used to describe evidence to suggest, but falls short of the "probable" conclusion.

8. No conclusion can be reached regarding whether or not the entries that correspond to Certificate 20 in the Ledger and the signatures on Q24 were created on their purported dates. Q23 was signed with Ink C, but the document was not dated.

9. No conclusions can be reached regarding whether or not Certificate 1, 2, and 17 (Inks E, F, and G) were produced on their purported dates. The writing ink used directly on Certificate 1and 17 (blue non-ballpoint) did not match the inks used for the corresponding entries in the Ledger (black ballpoint) for Certificate 1 and 17. Determining the level of PE for the purpose of determining the age of an ink is not appropriate for non-ballpoint inks (e.g., roller ball pens, gel inks, and fountain pens).

10. Certificate 7 was formatted differently than all other Certificates and the red CANCELLED stamp did not have a defect like the 6 other stamps used. No conclusion can be reached about the authenticity of Certificate 7 and Certificate 20 since these were not originals, and instead copies.

11. The loss of PE in the signature found on Certificate 19 (Ink D) was 4%, but this value does not provide evidence that the ink is more than two years old. This writing ink may exhibit characteristics of a fast aging ink, which could "dry out" in as little as two weeks.

12. It was determined that the certificates presented for inspection in this case are readily available on the internet. The manufacturer has been contacted to determine when the certificates were first available and if there have been any changes to the artwork, formatting, or the standard pre-printed text. No conclusion can be reached at this time about the authenticity of the certificates with respect to the purported dates of when they were obtained.

Gerald M. LaPorte, MSFS
Forensic Chemist and Document Dating Specialist

ATTACHMENT 1

GERALD M. LAPORTE
Curriculum Vitae

Positions:

Forensic Chemist & Document Dating Specialist
Riley Welch LaPorte & Associates Forensic Laboratories
Lansing, Michigan USA

Education:

University of Alabama at Birmingham (1994)
Birmingham, Alabama USA
Master of Science in Forensic Science (M.S.F.S.)

University of Windsor (1992)
Windsor, Ontario Canada
Bachelor of Commerce in Business Administration

University of Windsor (1990)
Windsor, Ontario Canada
Bachelor of Science in Biology (B.Sc.)

Professional Experience:

United States Government (03/09 – Present)
Forensic Policy Program Manager and Acting Associate Director
Duties: Provide expert analysis and advice on agency-wide programs or issues of national impact relating to forensic science; provide expert advice to top management officials; identify reasons for the nature and/or extent of program-related problems that arise and investigate area in need of improvement; write comprehensive resolution recommendations; formally present findings before large and diverse audiences, such as Federal, state, and local government representatives, special interest groups, the scientific community, and the media.

United States Secret Service (04/01 – 03/09)
Chief Research Forensic Chemist (11/07-03/09); Senior Document Analyst (06/05-11/07); Document Analyst (04/01-06/05)
Duties: Serve as the technical liaison and research chemist for the United States Secret Service pertaining to issues related to the chemistry of documents and fingerprints; coordinating clandestine tagging programs; direct all research projects within the Forensic Services Division.
Laboratory Duties: perform physical and chemical examinations on a variety of documents to determine how they were produced, where they may have originated from, and if they are authentic. These types of documents include anonymous letters (e.g., threatening, kidnapping, and extortion), suspected counterfeit identifications and financial documents (e.g. travelers checks, credit cards), contracts, and other miscellaneous written materials. Chemical examinations are conducted using thin layer chromatography (TLC), gas chromatography/mass spectrometry (GC/MS), liquid chromatography-mass spectrometry (LC/MS), infrared spectroscopy (IR), scanning electron microscopy/energy dispersive x-ray analysis (SEM/EDXA); perform chemical tests on unknown (e.g. miscellaneous powders) and controlled substances; testify in court as an expert witness.
Administrative Duties: responsible for the overall activities of the instrumental analysis laboratory including supervising interns and contractors, establishing fiscal year budgets for laboratory supplies, maintaining and purchasing all laboratory equipment, and the overseeing of two of the world's largest databases for writing and printer inks; participate in the hiring of new employees and the training of new forensic document examiners within the instrumental laboratory.

Marymount University (08/08 – 01/09)
Adjunct Professor of Forensic Science
Arlington, VA
Duties: Prepare and conduct lecture material in various areas of the forensic sciences and prepare all laboratory exercises and examinations for graduate students
United States Secret Service, Washington, DC (04/01 – 03/09)

Virginia Division of Forensic Science, Richmond, VA (11/99 – 04/01)
Forensic Scientist
Duties: analyze evidence for the presence or absence of controlled substances using a variety of chemical and instrumental tests; utilize sophisticated instrumentation such as gas chromatography/mass spectrometry and Fourier transform infrared spectroscopy; testify in court as an expert witness

Anne Arundel County Police Department Crime Lab, Millersville, MD (01/99 -11/99)
Forensic Chemist
Duties: similar to the duties specified for Virginia Division of Forensic Science

Accu-Chem Laboratories, Richardson, TX (07/96 – 09/98)
Forensic and Clinical Toxicology Specialist
Duties: supervisor of toxicology department; sales and marketing of drug testing and occupational and environmental toxicology testing; serve as a liaison to physicians and personnel responsible for forensic urine drug testing; testify in court as an expert witness in the area of forensic urine drug testing

Jefferson County Coroner/Medical Examiner Office, Birmingham, AL (09/93 - 07/96)
Autopsy Assistant/Forensic Technician
Duties: identify, collect, preserve, and document any potential evidentiary material; eviscerate all human organs and document any relevant findings; perform histological examinations

University of Alabama at Birmingham, Birmingham, AL (01/94 – 07/96)
Guest Forensic Science Lecturer
Duties: lecture on areas related to forensic pathology and death investigation to undergraduate and graduate students

Honors/Professional Affiliations:

American Academy of Forensic Sciences (AAFS)
Mid-Atlantic Association of Forensic Scientists (MAAFS)
American Standards for Testing and Materials (ASTM)
American Society of Questioned Document Examiners (ASQDE)
Guest Reviewer for the Journal of Forensic Sciences
Guest Reviewer for the Journal for the American Society of Questioned Document Examiners
Contributing member and Technical Contact in the Scientific Working Group for Questioned Document Examiners (SWGDOC)
Contributing member in the European Document Examiners Working Group (EDEWG) and the International Collaboration for Ink Dating (INCID)
Recipient of the "2005 Forensic Scientist of the Year" by the Mid-Atlantic Association of Forensic Scientists
Recipient of the United States Attorney's Office Eastern District of Virginia "Law Enforcement Public Service Award"

Professional and Scientific Committees:

1. Co-Chair on the Standards, Practices, and Protocols Inter-Agency Working Group – **Executive Office of the President of the United States**/Office of Science and Technology Policy/National Science and Technology Council/Committee on Science/Subcommittee on Forensic Sciences
2. Participating member in the Expert Working Group for Human Factors in Latent Print Analysis
3. Participating member in the Expert Working Group for AFIS Interoperability
4. Participant member in the Expert Working Group for the Preservation of Biological Evidence

LECTURES AND INSTRUCTIONAL COURSES CONDUCTED

1. **Workshop Instructor.** "Inkjet Technology and Forensic Examinations" at the Annual Meeting for the American Society of Questioned Document Examiners (ASQDE). Dearborn, MI, August 2009.
2. **Workshop Instructor**. "Inkjet Technology and Forensic Examinations" at the Annual Meeting for the Southern Association of Forensic Document Examiners (SAFDE). Peach Tree City, GA, April 8, 2009.
3. **Workshop Instructor.** "Inkjet Technology and Forensic Examinations" at the Skill-Task Training Assessment & Research (ST2AR) Fall Workshop. Las Vegas, NV, October 22-23, 2008.
4. **Workshop Instructor.** "Applications of Light and Color Theory in Forensic Document Examinations" at the American Academy of Forensic Sciences Annual Meeting, Washington, DC, February 18, 2008.
5. **Workshop Instructor.** "Methods Used for Authenticating Questioned Documents" at the Mid-Western Association of Forensic Scientists (MAFS) Annual Meeting, Traverse City, MI, September 25, 2007.
6. **Workshop Instructor.** "Methods Used for Authenticating Questioned Documents" at the American Society of Questioned Document Examiners (ASQDE) Annual Meeting, Boulder, CO August 13-14, 2007.
7. **Instructor for the Midwest Forensic Resource Center (MFRC)** – Recorded Training. Questioned Documents and the Crime Scene, Ames, IA, July 18, 2007.
8. **Instructor at the Federal Bureau of Investigation (FBI) Academy** - Forensic Document Examiner Training Seminar, Quantico, VA. "An Analytical Approach to Forensic Document Examination." April 17, 2007.
9. **Instructor at the George Washington University**, Washington, DC. "An Analytical Approach to Forensic Document Examination." February 28, 2007.
10. **Instructor at Marymount University**, Arlington, VA. An Analytical Approach to Forensic Document Examination." November 14, 2006.
11. **Workshop Instructor**. "Authenticating Documents "American Board of Forensic Document Examiners (ABFDE). Las Vegas, NV, November 6-7, 2006.
12. **Instructor at the George Washington University**, Washington, DC. "An Analytical Approach to Forensic Document Examination." October 18, 2006.
13. **Workshop Instructor.** "The Forensic Examination of Documents Produced with Office Machine Systems Utilizing Inkjet Technology." The International Association for Identification (IAI) 91st International Education Conference, Boston, MA, July 3, 2006.
14. **Workshop Instructor.** "Security Features in Documents. " Mid-Atlantic Association of Forensic Scientists Annual Meeting, May 3, 2006.
15. **Instructor at the Federal Bureau of Investigation (FBI) Academy** - Forensic Document Examiner Training Seminar, Quantico, VA. "The Forensic Examination of Inks." April 5, 2006.
16. **International Instructor in Doha, Qatar.** "The Examination of Counterfeit Documents." March 27-28, 2006.
17. **Instructor at Marshall University**, Huntington, WV. "Forensic Science at the United States Secret Service." March 15, 2006.
18. **Instructor at Indiana University-Purdue University at Indianapolis.** "Forensic Science at the United States Secret Service." December 12, 2005.
19. **Workshop Instructor.** "The Forensic Examination of Printing Processes." American Board of Forensic Document Examiners (ABFDE). Las Vegas, NV, November 7-8, 2005.
20. **Instructor at the George Washington University**, Washington, DC. "The Forensic Examination of Printers and Copiers." December 1, 2004.
21. **Instructor at the University of Windsor**, Windsor, Ontario Canada. "Questioned Document Examinations." November 10, 2004.

22. **Instructor at the University of Windsor**, Windsor, Ontario Canada. "Forensic Science at the United States Secret Service." November 9, 2004.
23. **Instructor at the University of Windsor**, Windsor, Ontario Canada. "Forensic Drug Chemistry and Toxicology." November 8, 2004.
24. **Instructor at George Washington University**. "The Forensic Examinations of Inks and Paper." George Washington University, October 27, 2004.
25. **Workshop Instructor.** "The Forensic Examination of Documents Produced By Office Machine Systems Utilizing Inkjet Technology." Northeastern Association of Forensic Sciences, September 30, 2004.
26. **Instructor at Federal Law Enforcement Training Center.** "The Forensic Examination of Printers and Copiers" and "The Forensic Analysis of Inks and Paper." Brunswick, GA. June 21, 2004.
27. **Guest Speaker at the Federal Bureau of Investigation Laboratory.** "Forensic Chemistry and Questioned Document Examinations." Quantico, VA. May 5, 2004.
28. **Instructor at Forest Park High School.** "Applications of Forensic Chemistry." Woodbridge, VA. May 18, 2004.
29. **Workshop Instructor.** "The Forensic Examination of Documents Produced By Office Machine Systems Utilizing Inkjet Technology." Mid-Atlantic Association of Forensic Sciences, April 20, 2004.
30. **Instructor at George Washington University.** "The Forensic Examination of Printers and Copiers." George Washington University, November 20, 2003.
31. **Instructor at George Washington University.** "Ink and Paper Chemistry." George Washington University, October 30, 2003.
32. **Instructor at Marshall University.** "Ink and Paper Chemistry" and "Counterfeit Identification Examinations." Huntington, WV. September 23, 2003.
33. **International Instructor. International Law Enforcement Academy (ILEA).** "Ink and Paper Chemistry" and Counterfeit Document Examinations." Pretoria, South Africa. May 19-20, 2003.
34. **Instructor at Federal Law Enforcement Training Center.** "Printing Processes" and "Physical and Chemical Analysis of Inks and Paper." Brunswick, GA. June 22, 2003.
35. **International Instructor. International Law Enforcement Academy (ILEA).** "Ink and Paper Chemistry" and Counterfeit Document Examinations." Pretoria, South Africa. May 19-20, 2003
36. **International Instructor. International Criminal Investigative Training Program (ICITAP)**, U.S. Department of Justice, "Counterfeit Document Examinations" and "Ink and Paper Chemistry." Sophia, Bulgaria. January 16-17, 2003.

PROFESSIONAL PRESENTATIONS

1. **LaPorte, G.** and Singer, K. Artificial Aging of Documents. Presented at the American Academy of Forensic Sciences Annual Meeting, Atlanta, GA, February 23, 2012.
2. **LaPorte, G.** Trace Evidence Moving Forward. Presented as part of a plenary panel at the 2011 Trace Evidence Symposium: Science, Significance, and Impact. Kansas City, MO, August 9, 2011.
3. **LaPorte, G.** The National Academy of Sciences Report: 2 Years Later. Presented at the Chesapeake Bay Division for the International Association of Identification. Cambridge, MD, March 21, 2011.
4. **LaPorte, G.** Forensic Science: The Importance of Research for Practical Casework. Presented as a Keynote Speech at the 1st Annual World Congress of Forensic Science. Dalian, China, October 21, 2010.
5. **LaPorte, G.** The Importance of Validating and Verifying a Standardized Method: Envelope Examinations and the Anthrax Investigation. Presented at the Mid-Atlantic Association of Forensic Scientists Annual Meeting. Hunt Valley, MD, May 8, 2009.
6. **LaPorte, G.** Questioned Documents and Homicide Investigations. Presented at the Annual Meeting for the Virginia Homicide Investigators Association. Norfolk, VA, October 6, 2008.
7. **LaPorte, G.** Questioned Documents and the Sub-Disciplines. Presented at the Symposium on Special Topics in Questioned Document Analysis. Ankeny, IA, September 30, 2008.
8. **LaPorte, G.** An Overview of the Forensic Examinations on Documents Produced Using Inkjet and Thermal Printing Devices and the Increasing Need for Security. 31st Annual Global Inkjet Printing Conference, Budapest, Hungary, March 12, 2008.
9. **LaPorte, G**, Beuchel, A, and Stepehns, J. The Examination of Commercial Printing Defects to Assess Common Origin and Batch Variation. Presented at the American Academy of Forensic Sciences Annual Meeting, Washington, DC, February 22, 2008.

10. **LaPorte, G.** Exonerations and Incarcerations: The Key Role of the Forensic Sciences – Questioned Documents. Presented at the American Academy of Forensic Sciences Annual Meeting, Washington, DC, February 19, 2008.
11. **LaPorte, G**, Holifield, A, and Stephens, J. The Black Money Scam. Presented at the Mid-Atlantic Association of Forensic Scientists Annual Meeting, Washington, DC, May 24, 2007.
12. Schwartz, R. and **LaPorte, G.** The Effects of Common Environmental Variables on the Infrared Luminescence Properties of Writing Inks. Presented at the Mid-Atlantic Association of Forensic Scientists Annual Meeting, Washington, DC, May 25, 2007.
13. Holifield, A and **LaPorte, G**. Artificially Aged Documents. Presented at the Mid-Atlantic Association of Forensic Scientists Annual Meeting, Washington, DC, May 25, 2007.
14. Voiles, R., Stephens, J., and **LaPorte, G.** The Forensic Examination of Documents Using Print Quality Analysis Software. Presented at the Mid-Atlantic Association of Forensic Scientists Annual Meeting, Washington, DC, May 25, 2007.
15. **LaPorte, G.** Forensic Applications of Chromatography at the United States Secret Service. Presented for the Minnesota Chromatography Forum. Minneapolis, MN, March 27, 2007.
16. **LaPorte, G.** The Necessity of Security Printing for the Forensic Scientist. Presented at the 30th Annual Global Inkjet and Thermal Conference. Prague, Czech Republic, March 2, 2007.
17. **LaPorte, G.,** Stoker, D., Thomas, Y, Stephens, J, and Shaffer, D. The Analysis of 2-Phenoxyethanol for the Dating of Documents. Presented at the 59th Annual Meeting of the American Academy of Forensic Sciences, San Antonio, TX, February 22, 2007.
18. Shaffer, D., Stephens, J. **LaPorte, G.** A Comparison of the Physical and Chemical Characterization of Conventional Toners vs. Chemically Prepared Toners. Presented at the 59th Annual Meeting of the American Academy of Forensic Sciences, San Antonio, TX, February 23, 2007.
19. Nelis, E., LaPorte, G., and Thomas, Y. The Use of Electrospray Ionization – Mass Spectrometry for the Identification of Controlled Substances. Presented at the 59th Annual Meeting of the American Academy of Forensic Sciences, San Antonio, TX, February 23, 2007.
20. **LaPorte, G.** The Forensic Examination of Documents Produced on Office Machine Systems Utilizing Inkjet Technology. Presented at the California Association of Criminalistics Fall Workshop Meeting, October 12, 2006.
21. **LaPorte, G.** The Physical and Chemical Examinations of Documents Produced Using Inkjet Technology. Presented at the 4th Meeting of the European Document Experts Working Group, The Hague, Netherlands, September 28, 2006.
22. Schuler, R., Treado, P.J., Gardner, C., **LaPorte, G.**, Stephens, J. Chemical Imaging for Questioned Document Examination. Presented at the 4th Meeting of the European Document Experts Working Group, The Hague, Netherlands, September 29, 2006.
23. **LaPorte, G.** The Forensic Examination of Documents Produced Using Inkjet Technology. Presented at the Imaging Materials Seminar: Inkjet Ink, Rochester, NY, May2, 2006.
24. Layman, M. and **LaPorte, G.** Questioned Documents and the Crime Scene. Presented at the 58th Annual Meeting of the American Academy of Forensic Sciences, Seattle, WA, February 23, 2006.
25. Shaffer, D, Stephens, J., and **LaPorte, G**. The Characterization of Envelopes for Questioned Document Examinations. Presented at the 58th Annual Meeting of the American Academy of Forensic Sciences, Seattle, WA, February 23, 2006.
26. Stephens, J. and **LaPorte, G.** The Use of Hyperspectral Contrast Imaging for the Examination of Writing Inks. Presented at the 58th Annual Meeting of the American Academy of Forensic Sciences, Seattle, WA, February 23, 2006.
27. **LaPorte, G.** and Layman, M. The Use of Supplementary Testing in Forensic Document Examinations. Presented at the Annual Meeting for the American Society of Questioned Document Examiners, Montreal, Quebec, August 15, 2005.
28. **LaPorte, G.,** Arredondo, M, McConnell, Cantu, A. The Static Method of Dating Writing Inks – A Preliminary Assessment of the United States International Ink Library. Presented at the Mid-Atlantic Association of Forensic Scientists Annual Meeting, Pittsburgh, PA, May 19, 2005.
29. **LaPorte, G.** The Forensic Examination of Documents Produced Using Inkjet and Thermal Technology. Presented at the 28th Global Inkjet and Thermal Printing Conference, Barcelona, Spain, March 16, 2005.
30. **LaPorte, G.** The Examination of Inkjet Printed Documents – What's on the Frontier? Presented at the 57th Annual Meeting of the American Academy of Forensic Sciences, New Orleans, LA, February 24, 2005.

31. Shaffer, D. and **LaPorte, G.** Applications of Scanning Electron Microscopy/Energy Dispersive X-Ray Analysis at the United States Secret Service. Scanning: The Journal of Scanning Microscopies. Volume 26(2), March/April, 2004.
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34. Cochran, J., Glisson, F., and **LaPorte, G.** Characterization of Inks by Solid Phase Microextraction – Gas Chromatography/Time-of-Flight Mass Spectrometry. Pittconn 2004, Chicago, IL.
35. **LaPorte, G.** Analyzing Bar Soaps by Utilizing a Variety of Optical and Chemical Techniques. Presented at the 56th Annual Meeting of the American Academy of Forensic Sciences, Dallas, TX, February 20, 2004.
36. **LaPorte, G.** The Analysis of Volatile Organic Compounds in Ballpoint Inks Using Gas Chromatography/Mass Spectrometery. Presented at the 56th Annual Meeting of the American Academy of Forensic Sciences, Dallas, TX, February 19, 2004.
37. **LaPorte, G.** Inkjet Technology: The Need for Security and Forensic Traceability. Presented at the 11th Annual European Inkjet Printing Conference, Lisbon, Portugal, November 10, 2003.
38. **LaPorte. G.** Cold Cases in Forensic Science. Presented to the Virginia Homicide Investigators Association (VHIA). October 6, 2003.
39. **LaPorte, G.** The Use of an Electrostatic Detection Device (EDD) to Identify Class Characteristics on Documents Produced by Printers and Copiers. Presented at the American Society of Questioned Document Examiners Annual Meeting. August, 2003.
40. Wilson, J & **LaPorte, G.** The Differentiation of Gel Inks using Various Optical and Chemical Techniques. Presented at the Mid-Atlantic Association of Forensic Scientists Annual Meeting, Annapolis, MD, May 8, 2003.
41. **LaPorte, G.** The Analysis of 2-Phenoxyethanol in Ballpoint Inks Using Gas Chromatography/Mass Spectrometry. Presented at the Mid-Atlantic Association of Forensic Scientists Annual Meeting, Annapolis, MD, May 8, 2003.
42. **LaPorte, G.** The Forensic Examination of Thermal Transfer Printing. Presented for Information Management Institute: The 14th Annual Thermal Printing Conference, Scottsdale, AZ, April 28-30, 2003.
43. **LaPorte, G.** The Use of an Electrostatic Detection Device (EDD) to Identify Class Characteristics on Documents Produced by Printers and Copiers. Presented at the American Academy of Forensic Sciences Annual Meeting, Chicago, IL, February, 2003.
44. **LaPorte, G.** The Forensic Examination of Office Machine Systems Utilizing Inkjet and Toner Technology. Presented for Information Management Institute: The 10th Annual European Ink Jet Printing Conference, Lisbon, Portugal, October 28-30, 2002.
45. Payne, J & **LaPorte, G.** The Forensic Examination of Thermal Transfer Printers. Presented at the Mid-Atlantic Association of Forensic Scientists, Frederick Maryland, April 25, 2002.
46. **LaPorte, G** & Ramotowski, R. The Effects of Latent Print Processing on Questioned Documents Produced by Office Machine Systems Utilizing Inkjet Technology and Toner. Presented at the Mid-Atlantic Association of Forensic Scientists, Frederick Maryland, April 25, 2002.
47. **LaPorte, GM** & Davis, G.G. (1995). A Retrospective Study of the Incidence of Drugs in Decomposed Remains in Jefferson County, Alabama. Presented as an oral presentation at the American Academy of Forensic Sciences Annual Meeting, Seattle, WA.
48. Gruszecki, A, Davis, GG, **LaPorte, GM** & Robinson, CA (1995). The Incidence of Corresponding Presence of Cocaine and Cocaethylene in Both Hair and Routine Postmortem Biological Samples. Presented as a poster at the American Academy of Forensic Sciences Annual Meeting, Seattle, WA.

PROFESSIONAL PUBLICATIONS

1. Expert Working Group on Human Factors in Latent Print Analysis. Latent Print Examination and Human Factors: Improving the Practice through a Systems Approach. U.S. Department of Commerce, National Institute of Standards and Technology. February, 2012.
2. Houlgrave, S., **LaPorte, G.**, & Stephens, J. The Classification of Inkjet Inks Using AccuTOF™ DART™ (Direct Analysis in Real Time) Mass Spectrometry - A Preliminary Study. Accepted for Publication in the Journal of forensic Science on February 25, 2012.

3. **LaPorte, G.** & Stephens, J. *Analysis Techniques Used for the Forensic Examination of Writing and Printing Inks* in The Forensic Chemistry Handbook, John Wiley & Sons, 2012.
4. Houlgrave, S., **LaPorte, G.**, & Stephens, J. The Use of Filtered Light for the Evaluation of Writing Inks Analyzed Using Thin Layer Chromatography. Journal of Forensic Sciences, Volume 56 (3), May 2011.
5. **LaPorte, G.**, Stephens, J, and Beuchel, A. The Examination of Commercial Printing Defects to Assess Common Origin, Batch Variation, and Error Rate. Journal of Forensic Sciences, Volume 55 (1), January 2009.
6. Bicknell, D & **LaPorte, G.** *Documents, Forgeries and Counterfeit*" in The Wiley Encyclopedia of Forensic Sciences. John Wiley & Sons, 2009.
7. Arredondo, M., **LaPorte, G.**, Wilson, J., McConnell, T., Shaffer, D., & Stam, M. Analytical Methods Used for the Discrimination of Substances Suspected to be Bar Soap: A Preliminary Study. Journal of Forensic Sciences, Volume 51 (6), November 2006.
8. **LaPorte, G.**, Arredondo, M., McConnell, T., Stephens, J., Cantu, A., & Shaffer, D. An Evaluation of Matching Unknown Writing Inks with the United States International Ink Library. Journal of Forensic Sciences, Volume 51 (3), May 2006.
9. **LaPorte, G.** Modern Approaches to the Forensic Analysis of Inkjet Printing – Physical and Chemical Examinations. Journal of the American Society of Questioned Document Examiners, Volume 7, Number 1, June 2004.
10. **LaPorte, G.** The Use of an Electrostatic Detection Device to Identify Individual and Class Characteristics on Documents Produced by Printers and Copiers – A Preliminary Study. Journal of Forensic Sciences, Volume 49 (3), May 2004.
11. **LaPorte, G.**., Wilson, J, & Cantu, A. The Identification of 2-Phenoxyethanol in Ballpoint Inks Using Gas Chromatography/Mass Spectrometry. Journal of Forensic Sciences, Volume 49 (1), January 2004.
12. Wilson, J, **LaPorte, G**, & Cantu, A. Differentiation of Black Gel Inks Using Optical and Chemical Techniques. Journal of Forensic Sciences, Volume 49 (2), March 2004.
13. **LaPorte, G.** Published Book Review, "Advances in the Forensic Analysis and Dating of Writing Ink." Journal of Forensic Identification Volume 53(6), 2003\735.
14. **LaPorte, G,** Wilson, J, Mancke, S. Amanda, Payne, J, Ramotowski, R, & Fortunato, S. The Forensic Analysis of Thermal Transfer Printers, Journal of Forensic Sciences, Volume 48 (5), September 2003.
15. **LaPorte, G** & Ramotowski, R. The Effects of Latent Print Processing on Questioned Documents Produced by Office Machine Systems Utilizing Inkjet Technology and Toner, Journal of Forensic Sciences, Volume 48 (3), May, 2003.
16. Lovett Doust, J & **LaPorte, G** (1991). Population Sex Ratios, Population Mixtures and Fecundity in a Clonal Dioecious Macrophyte, *Vallisneria Americana.* Journal of Ecology. 79: 477-489.

Court Testimony:

I have testified approximately **35-40** times in the Commonwealth of Virginia and the States of Texas and Maryland on issues related to forensic urine drug testing and controlled substance analysis.

I have also testified **over 25** times on issues related to forensic document examinations in State, Federal, and International courts as follows:

1.	Tax Court of Canada vs L.D.G. 2000 Incorporated Montreal, Quebec Canada	April 9, 2002
2.	USA v William Bartmann United States District Court – Northern District of Oklahoma	October 17, 2003
3.	USA v Clayton Lee Waagner United States District Court – Eastern District of Pennsylvania	December 2, 2003
4.	Matter of Singh, Atvar (A76-676-494) U.S. Department of Homeland Security – Immigration and Customs Enforcement	July 16, 2004
5.	USA vs Paul Ihle, Jr. United States District Court – Northern Indiana	September 9, 2004
6.	State v Matthew C. Owens, Case # 2NO-SO3-821 CR Nome, Alaska	January 27, 2005

7. USA v Sylvester Richards Gayekpar
   United States District Court – District of Minnesota — October 12, 2005
8. State v Matthew Owens, Case # 2NO-S03-821 CR
   Kotzebue, Alaska — November 2, 2005
9. USA v Robert Sterling Miller – Western District of Texas
   Austin, Texas, Case#A-05-CR-247 SS — April 26, 2006
10. USA v Hector R. Lugo-Rios – United States District Court, Judicial District of Puerto Rico
    San Juan, Puerto Rico, Case#05-354 (JAF) — May 24, 2006
11. USA v Nancy Harlow – Northern District of Texas
    Dallas, Texas, Case#3:06-CR-011-D — July 18, 2006
12. USA v Hector R. Lugo-Rios et al – United States District Court, Judicial District of Puerto Rico
    San Juan, Puerto Rico, Case#05-354 (JAF) — August 25, 2006
13. State of New Jersey v Alfred Smith
    Superior Court of New Jersey, County of Burlington
    Mt. Holly, NJ, Case#05-1988 — August 31, 2006
14. USA v Cleveland Kilgore – U.S. District Court For the District of Maryland
    Baltimore, MD, Case#RDB-06-0115 — September 21, 2006
15. USA v Isidore Nouthong et al – U.S. District Court For the Eastern District of Virginia
    Alexandria, VA, Case#:1:06cr305 — October 26, 2006
16. USA v Isidore Nouthong et al – U.S. District Court For the Eastern District of Virginia
    Alexandria, VA, Case#:1:06cr305 — February 7, 2007
17. USA v Clyde Cook – U.S. District Court For the Eastern District of Tennessee
    Memphis, TN — April 10, 2007
18. USA v Jermain Betea
    Eastern District of Virginia
    Alexandria, VA, Case#1:06cr305 — May 3, 2007
19. USA v Crist Dauberman
    Eastern District of Virginia
    Richmond, VA , Case#3:07CR040 — May 8, 2007
20. USA v Jose Padilla et al – U.S. District Court For the Southern District of Florida
    Miami, FL, Case#04-60001-CR-Cooke — July 12, 2007
21. Commonwealth of Kentucky v Quincy Omar Cross
    Hickman Circuit
    Clinton, KY, Case#08-CR-00001 — April 2, 2008
22. People of the State of NY v Stacey Castor
    County of Onondaga
    Syracuse, NY, DR#05-359834/07-402152 — January 21, 2009
23. International Arbitration. Bank Julius Baer Co. Ltd v Waxfield Ltd Llc Bbcfd Sa G 04-6668-Cv 424 F.3d 278.
    New York, NY. — June 11, 2009
24. USA v Mark A. O'Hair, Et AL
    Northern District of Florida
    Pensacola, FL, Case #3:08cr75/LAC — July 28, 2009
25. International Center for Settlement of Disputes (ICSID); Libananco Holdings Co. Limited v. Republic of Turkey
    ICSID Case No. ARB/06/8 — November 3, 2009
26. Lake Forest Master Community Association v. Orlando Lake Forest Joint Venture, Orlando Lake Forest Inc., NTS Mortgage
    Case No. 07-CA-1867-L
    Seminole County, FL — March 25, 2010

27. USA v Raogo Ouedraogo,
    U.S. Western District of Michigan
    Case No. 1:08-CR-68
    Grand Rapids, MI — March 10, 2011
28. Yakov Shlimovich v Mikhail Cheban, et al
    Case No. BC408095
    Superior Court of the State of California
    Los Angeles, CA — March 25, 2011
29. USA v Rami Saba
    U.S. Western District of Michigan
    Case No. 1:08-CR-68
    Grand Rapids, MI — May 20, 2011