I, John J. Lentini, under penalty of perjury, hereby swear that the following is true and based on my personal knowledge:

**Qualifications**

1. I am an expert in using gas chromatography/mass spectrometry (GC-MS) to identify ignitable liquid residues ("ILRs") in fire debris.
2. I have personally conducted more than 2,000 fire scene inspections and have been accepted as an expert witness on more than 200 occasions.
3. I have worked in the field of fire investigations since 1974. I began my career with the State of Georgia Crime Laboratory, where I worked from 1974-77, and have worked as a private fire investigator since that time.
4. I graduated with a B.A. in Natural Sciences from the New College in Sarasota, Florida. I took post-graduate courses in chemistry and criminal investigation at the University of Akron from 1973-74 and completed twenty credit hours of graduate-level chemistry at Georgia State University in 1979-80.

5. I am certified by the International Association of Arson Investigators (IAAI) and the National Association of Fire Investigators (NAFI). I am also a certified Diplomate of the American Board of Criminalistics (ABC), with a specialty in Fire Debris Analysis. Obtaining ABC certification requires successfully completing a written general knowledge examination covering all phases of evidence handling and analysis, and a specialty examination on the details of fire debris analysis. I was elected Chair of the American Society for Testing and Materials (ASTM) Committee E30 on Forensic Sciences in 1999 and re-elected in 2001 and 2003. I have also served as a Member of the American Academy of Forensic Sciences President’s Panel on Scientific Integrity. I serve on the Houston, TX, Forensic Science Center’s Technical Advisory Board. I have been invited by the National Academy of Science and the American Association for the Advancement of Science to advise these groups about fire debris analysis.

6. Among my peer-reviewed publications relating to the chemical analysis of fire debris are:


• “Standard Test Method for Flammable or Combustible Liquid Residues in Extracts from Samples of Fire Debris by Gas Chromatography,” ASTM E1387-90. Principal author as Task Group Coordinator.

• “Guidelines for Laboratories Performing Chemical and Instrumental Analysis of Fire Debris Samples,” Principal author as Co-Chair of IAAI Forensic Science Committee, June 1988.

7. I have also authored a fire investigation textbook, which includes a chapter on GC-MS analysis of fire debris, and have contributed several chapters on the subject to other forensic science textbooks.

8. A copy of my resume is attached hereto as Appendix 1.

Scope of Assignment
9. On March 24, 2016, I was requested by counsel for the Petitioner to review the chemical analysis data that was produced by the Missouri Highway Patrol Forensic Laboratory in this case. I was not requested to address any of other forensic science issues in this case. I agreed to conduct the review pro bono.

Summary of opinions
10. The substance detected on the Petitioner’s shoes was not gasoline. It was, instead, aromatic solvent used in the manufacture of the tennis shoes. The bases for this opinion will be explained below.

11. Counsel for the Petitioner apparently did not have the chemical analysis data reviewed prior to the trial by a competent expert.

Minimum Criteria for the Identification of Gasoline
12. Gas chromatography-mass spectrometry (GC-MS) has the capability of detecting the different kinds of compounds that are found in gasoline.
13. The criteria for identifying gasoline by GC-MS are set forth in a peer-reviewed voluntary consensus standard promulgated by ASTM Committee E30 on Forensic Sciences. The standard has been in existence since 1994.

14. Prior to 1994, the only standard method agreed upon by the forensic science community was gas chromatography. Criteria for identification of ignitable liquids were first set down in 1982 by the Bureau of ATF, then elaborated on by the International Association of Arson Investigators (IAAI) Forensic Science Committee in 1988, and finally adopted by ASTM Committee E30 on Forensic Sciences in 1990. This standard, known as ASTM E1387 required pattern matching, because the gas chromatograph, without a mass spectrometer attached is not capable of identifying substances to the extent that GC-MS is. In 1994, a Standard Guide for Ignitable Liquid Residues in Extracts from Fire Debris Samples by Gas Chromatography-Mass Spectrometry was adopted. A copy of that standard is attached hereto as Appendix 2.

15. Gasoline is dominated by a class of compounds known as aromatic, hydrocarbons based on a benzene ring.

16. Gasoline also contains other classes of compounds, particularly a group of compounds known as alkanes. Alkanes do not contain benzene rings. They have the formula C\textsubscript{2}H\textsubscript{2n+2}. In order to be identified as gasoline, an ignitable liquid residue must have certain aromatic groups, but it must also contain alkanes. If a substance contains the aromatic compounds but not the alkanes, then it is not gasoline.

17. The following are the minimum criteria for the identification of gasoline as they existed at the time of the fire and chemical analysis in the Politte matter.

   CLASS 2 (Gasoline)
   **ALKANE:** Pattern varies; n-alkanes above C\textsubscript{9} may be present; saturated branched alkanes must be present.
   **CYCLOALKANE:** Not significant.
   **AROMATIC:** Petroleum distillate pattern comparable to that of known standards; 1-methyl-3-ethyl benzene (m ethyltoluene), 1-methyl-4-ethyl benzene (p-ethyltoluene), 1,3,5-trimethylbenzene, 1-methyl-2-ethylbenzene (o-ethyltoluene), 1,2,4-trimethylbenzene, and 1,2,3-trimethylbenzene must be present; above C\textsubscript{7} the
aromatic concentration is generally substantially higher than the alkane concentration.

CONDENSED RING AROMATIC: Petroleum distillate pattern comparable to that of known standards are usually present, including 1- and 2-methylnaphthalenes. These compounds may be absent in some gasolines.

**Cautions:** The presence of high levels of alkene gases and oxygenates may indicate significant pyrolysis of the matrix and should make the recovery suspect. The presence of high levels of aromatics without the appropriate level of alkanes may indicate an aromatic naphtha (Class 0).

**Shoes**

18. In 1996, the potential confusion caused by the analysis of shoes was first elucidated in a poster presentation at the American Academy of Forensic Sciences annual meeting in Nashville, Tennessee. The paper, called “Arsonists Shoes: Clue or Confusion?” was authored by Cheryl Cherry, who was then a fire debris analyst with the Michigan State Police. In that paper, Ms. Cherry described the numerous aromatic compounds, some the same as those found in gasoline, which could be found in manufactured shoes.

19. When a person enters a shoe store, there is a distinctive odor that is caused by the numerous aromatic compounds that shoe manufacturers use in adhesives and other components of shoes. These can complicate the analysis of shoes in a forensic science laboratory.

20. In 2000, I conducted research and co-authored a peer-reviewed paper with Ms. Cherry and with Julia Dolan, who is currently the chief chemist with the Bureau of Alcohol, Tobacco and Firearms (ATF) laboratory in Ammendale, Maryland. In our research, we studied shoes extensively, and learned that they were full of various compounds that could be identified as ignitable liquids. These ignitable liquids were part of the manufactured shoe. A copy of that paper, entitled “The Petroleum-laced Background,” is attached as Appendix 3. This article has been cited numerous times in textbooks and in other peer-reviewed articles on fire debris analysis.

**The Analysis of Mr. Politte’s shoes**

21. The chemical analysis data provided to me shows that the mixture of compounds isolated from the shoes (Items 5A and 5B) is different from the gasoline found in three other samples. (Items 8A, 8B, and 25).
22. Dominic Miranda, the chemist from the Missouri Highway Patrol Forensic Laboratory, correctly analyzed the shoes separately. This analysis resulted in the isolation of approximately the same amount of aromatic solvent from each shoe.

23. When one considers what happens if someone is pouring gasoline and accidentally gets it on his shoes, it is unlikely that exactly the same amount would fall on each shoe. On the other hand, if the compounds were part of the shoes when they left the factory, approximately equal amounts would be expected. Figure 1 shows a comparison of the left and right shoes in Total Ion Chromatogram (TIC) of the left and right shoes.

![Figure 1](image.png)

**Figure 1.** Comparison of the TICs of the two shoes, showing approximately the same amount of compounds eluting after 3 minutes (The X-axis shows time in minutes). The peaks on the bottom chart appear shorter because the Y-axes are scaled differently (~180,000 v. ~20,000). These charts are taken from pages Bates stamped 1732 and 1736.
24. In addition to the total ion chromatograms, Mr. Miranda also prepared for each sample seven extracted ion chromatograms (EICs). These are chromatograms that show only certain compounds having a particular sized mass in the ions created in the mass spectrometer. The alkanes are represented by the top four charts on each page of EICs: ions 43, 57, 71, and 85. The aromatics are represented by the bottom three charts: ions 91, 105, 119. These EICs, as well as the TICs from the relevant samples are attached hereto as Appendix 4.

25. The melted plastic samples, Items 8 A and 8B, and the green liquid, Item 25, show an abundance of alkanes, while the shoes (Items 5A and 5B) show no alkanes. There is some noise in the alkane charts of Item 5B, but because each chart is different, it can be stated with certainty that this is in fact noise, and not a signal from alkanes.

26. Thus, it can be stated that the substance isolated from the two shoes did not have a common origin with the gasoline isolated from the melted plastic samples or the green liquid. Further, it can be stated that this substance is aromatic solvent, which is a component of the shoes, rather than gasoline.

Counsel did not effectively cross-examine the State’s chemical analysis witness

27. I have reviewed the direct and cross-examination testimony of Mr. Carl Rothove who was Mr. Miranda’s supervisor. (Mr. Miranda was no longer employed by the forensic laboratory at the time of the trial.) Nowhere in the cross-examination was there any mention of the absence of alkanes in the sample extracted from the Petitioner’s shoes. There should have been such a cross-examination, and had Mr. Williams consulted with a competent fire debris analyst, the discrepancy in the analysis would have been pointed out.

28. I hold the opinions expressed herein to a reasonable degree of professional certainty.

Further Affiant sayeth naught.

This 9th day of August, 2016.

John J. Lentini
APPENDIX 1

AUTHOR’S RESUME
Resume of
John J. Lentini, CFI, D-ABC
Scientific Fire Analysis, LLC
8805 Overseas Highway, #10-134
Islamorada, FL 33036
(770) 815-6392
www.firescientist.com scientific.fire@yahoo.com

Capabilities

He can investigate fire or explosion scenes, locate the point of origin, and chemically determine the presence of flammable liquids or explosives. He can evaluate the validity of the work of other investigators through review of reports, testimony, photographs and other data. He is familiar with fire and building codes and can determine whether a structure, product, service or installation met applicable code requirements prior to a fire or other loss. He is capable of performing all types of chemical and instrumental analyses, and giving expert testimony as to the results of his investigations and analyses.

Scientific Fire Analysis Responsibilities

President and Principal Investigator. Conducts preliminary evaluations of customer problems. Conducts, supervises or reviews investigations in the area of fire, arson, explosion, and asphyxiation, including review of chemical analysis issues. Prepares and presents expert testimony. Provides litigation support. Provides training to fire investigators, fire litigators and the public.

Education

Postgraduate courses in Chemistry and Criminal Investigation, University of Akron, OH, 1973-74.
Twenty credit hours Graduate Level Chemistry, Georgia State University, Atlanta, GA, 1979-80.

Training

Short Course in Instrumental Analysis, F.B.I. Academy, Quantico, VA, 1976.
Seminar on Arson and Fraud Investigation, University of Alabama at Birmingham, 1979.
Seminar on Gas Fires and Explosions, University of Alabama at Birmingham, 1980.
33rd, 35th, 37th, 39th, 40th, 42nd and 59th International Association of Arson Investigators Seminars, 1982-91.
Forensic Fire Engineering and Failure Analysis, Society of Fire Protection Engineers (SFPE), 1998.

EXHIBIT 1
Training (continued)

Third International Symposium on Fire Investigation, University of Cincinnati, Cincinnati OH, 2008.
Fourth International Symposium on Fire Investigation, University of Maryland, Columbia, MD, 2010.
Fifth International Symposium on Fire Investigation, University of Maryland, Columbia, MD, 2012.
Australian Associations of Fire Investigators, Achieving Better Outcomes, Gold Coast, QLD, 2014.
Canadian National Advanced Fire, Arson and Explosion Training Conference, Markham, ON, 2015.

CFI Trainer.net modules
Introduction to Fire Dynamics and Modeling, 2008.
Post Flashover Fires, 2009.
Understanding Fire Through the Candle Experiments, 2011.
Wildland Fire Investigation, 2014
Electrical Safety, 2014
Residential Natural Gas Systems, 2015

Professional Certifications and Licensure

He holds certifications from both the International Association of Arson Investigators (IAAI) and the National Association of Fire Investigators (NAFI). He is also a certified Diplomate of the American Board of Criminalistics, with a specialty in Fire Debris Analysis.

He holds Florida private investigator’s license number C 2600083. Florida has reciprocal license agreements with the following states: CA, GA, LA, NC, OK, TN, VA.

Experience

Applied Technical Services, Inc. 1978-2006
Manager, Fire Investigations. Authored over 3,000 technical reports. Supervised two fire investigators and an electrical engineer. Managed a chemical analysis laboratory for fire debris using gas chromatography-mass spectrometry (GC-MS). Analyzed more than 20,000 samples. Served as project manager for major fire investigations. Conducted site inspections, chemical analyses, designed and conducted physical experiments to re-create fire scenarios. Provided training, consulting and expert witness testimony.

Metallurgical Engineers of Atlanta May-December, 1977
Fire scene inspection. Chemical analysis of fire debris. Quantitative chemical and physical analysis on all types of metal. Radiographic inspection of fittings and welds.

State of Georgia Crime Laboratory August 1974 - May 1977
Qualitative and quantitative analysis of all types of physical evidence associated with violent and/or property crimes, and testifying to the results of such analyses. Responding statewide to conduct field investigations for law enforcement agencies. Instruction of law enforcement officers in the collection and preservation of physical evidence.
Courtroom Experience

Since 1975, he has given expert testimony in over two hundred cases in civil and criminal court in several states and in the Federal Courts. He has testified for both Plaintiffs and Defendants, and has twice served as a neutral expert hired to advise the court. A schedule of testimony provided since 2000, both in trial and in depositions, is available upon request.

Professional Associations

Member, National Fire Protection Association (NFPA) Technical Committee 921 on Fire Investigations, 1996-present. (Representing ASTM Committee E30 on Forensic Sciences)
Member, NFPA Technical Committee 1033 on Fire Investigator Professional Qualifications, 2012-present.
Member, NIJ/NIST Organization of Scientific Area Committees (OSAC), Subcommittee on Fires and Explosions, 2014-present.
Fellow of the American Academy of Forensic Sciences (AAFS) 1995-present. (Member since 1988)
AAFS Criminalistics Section: Chair, Nominating Committee, 1999-2007, Co-chair Program Committee 2012,
Chair, Program Committee 2013, Section Secretary, elected 2014, Section Chair, elected 2015.
Chair, ASTM Committee E30 on Forensic Sciences, elected 1999, re-elected 2001 and 2003.
Vice Chair, ASTM Committee E30 on Forensic Sciences, elected 1995, re-elected 1997 and 2005.
Director, American Board of Criminalistics (ABC), elected 1993, re-elected 1996.
Chair, ABC Proficiency Administration Committee, 1993-1999.
Member, Scientific Working Group on Fire and Explosion Investigations (SWGFEX), 1997-present.
Member of the National Association of Fire Investigators (NAFI), 1996-present.
Member of the International Association of Arson Investigators (IAAI), 1978-2001, 2008-present.
Member of the Florida Chapter of the IAAI, 2008-present.
Chair, IAAI Forensic Science Committee, 1988-1991.
Member of the American Chemical Society (ACS), 1978-present.

Advisory Panels

Member, AAFS President’s Panel on Scientific Integrity, 2009.
Member, Expert Witness Exchange Validation Committee, 2015-present.
Member, Technical Advisory Group for the Houston Forensic Science Center, 2015-present.
Member, Underwriters Laboratory Fire Safety Research Institute (FSRI) Technical Panel on Fire Forensics, 2016-present.
Member, Texas State Fire Marshal’s Science Advisory Workgroup, 2016-present.

Publications

Books

Scientific Protocols for Fire Investigation, First Edition, 2006,

Book Chapters

Encyclopedia of Forensic Sciences, 2nd Edition contributor of three entries (“Evidence Collection at Fire Scenes;” “Fire Scene Inspection Methodology;” “Fire Patterns and Their Interpretation”)
Book Chapters (continued)


“Basic Fire Science,” Chapter 3 and “Fire Patterns,” Chapter 4 in Fire Investigator Principles and Practice to NFPA 921 and 1033, 3rd Edition. IAFC, IAAI, NFPA and Jones and Bartlett, publishers, 2011. (both chapters co-authored with Jeff Spaulding.)


Standards


Fire and Arson Scene Evidence: A Guide for Public Safety Personnel, National Institute of Justice Office of Justice Programs, USDOJ Publication Number NCJ 181584, Contributor to the document as a member of the Editorial Board.

“Standard Practice for Investigating Carbon Monoxide Poisoning Incidents,” ASTM E2292-03, Principal Author as Task Group Coordinator.

“Standard Test Method for Flammable or Combustible Liquid Residues in Extracts from Samples of Fire Debris by Gas Chromatography,” ASTM E 1387-90. Principal Author as Task Group Coordinator.

“Guidelines for Laboratories Performing Chemical and Instrumental Analysis of Fire Debris Samples,” Principal author as Co-Chair of IAAI Forensic Science Committee, June 1988.

Peer Reviewed Publications


Editorial-Reviewed Publications


Selected Presentations (1996-Present)


“Fire and Science” and “NFPA 1033,” Louisiana Chapter of IAAI, December 12, 2015, Baton Rouge, LA


“The Long Road to Exoneration for Han Tak Lee,” AAFS Jurisprudence Section, February 19, 2015, Orlando, FL
Selected Presentations (continued)

“Cases Where Shifted Science as ‘New Evidence’ Played a Role,” American Academy of Forensic Sciences (AAFS), Workshop #8, From Fire Dynamics to Legal Dynamics: Shifted Science and the Criminal Justice System’s Response, February 16, 2015, Orlando, FL.


“Anatomy of a Train Wreck,” Keynote address at Australian Associations of Fire Investigators, October 9, 2014, Gold Coast, QLD, Australia (additional presentations October 8 and 10).


“Successful Challenges to BS (Bad Science) in Bogus Arson Cases,” New York State Defenders Association, April 26, 2014, Rochester, NY.


“Scientific Protocols for Fire Investigation,” Fairfax County Fire Department, October 22-24, 2013, Fairfax, VA.


“Scientific Protocols for Fire Investigation,” Oregon Chapter IAAI, January 29-February 1, 2013, Grants Pass, OR.


“Challenges to Accurate Fire Cause Determinations,” Forensics: Science Policies to Increase Confidence, briefing for congressional staffers sponsored by American Chemical Society (ACS), September 26, 2012, Washington, DC.


“Arson Investigation and Litigation,” 2012 Innocence Network Conference, UMKC School of Law, March 31, 2012 Kansas City, MO.


“Ignitable Liquid Residue Source Elimination by Molecular Weight Estimation,” AAFS Criminalistics Section, February 24, 2012, Atlanta, GA.

“Legal vs. Scientific Proof: And Never the Twain Shall Meet?,” AAFS Joint Session, Criminalistics and Jurisprudence, February 26, 2012, Atlanta, GA.


“Progress’ In Fire Investigation: Moving from Witchcraft and Folklore to the Misuse of Models and the Abuse of Science,” 4th ISFI, September 28, 2010, Columbia, MD.

“Rising From the Ashes – What We Have Learned From the Cameron Todd Willingham Case,” National Institute of Justice (NIJ) Annual Conference, June 16, 2010, Arlington, VA.
Selected Presentations (continued)


“Post Conviction Strategies in Arson Cases,” NACDL’s Litigating Non-DNA Post-Conviction Innocence Cases Training Program, April 15, 2010, Atlanta, GA.

“Avoiding Wrongful Convictions: Proving the Corpus Delicti,” AAFS Jurisprudence Section, February 26, 2010, Seattle, WA.


“Minimizing Expectation Bias in Fire Investigations,” Workshop # 17, Fires and Explosions: A Multidisciplinary Overview of Investigative Methods, Mental States of Perpetrators, and Psychological Trauma to Victims, AAFS, February 23, 2010, Seattle, WA.


“Forensics Under Fire-Case in Point,” TCCA Actual Innocence Conference, Center for American and International Law, August 18, 2009, Plano, TX.

“Forensic Science in the 21st Century: The National Academy of Sciences Report and Beyond,” Sandra Day O’Connor College of Law at the University of Arizona, April 4, 2009, Tempe, AZ.

“The State of the Art in Fire Investigation,” Inaugural Lecture Series, Centre for Forensic Science and Medicine, University of Toronto Medical School, February 27, 2009, Toronto, Ontario.


“Evaluating Arson Cases: Avoiding Wrongful Prosecutions and Convictions,” 63rd Annual Short Course for Prosecuting Attorneys, Northwestern University School of Law, July 22, 2008, Chicago, IL.


“Sources of Error in Fire Investigation,” AAFS Criminalistics Section, February 21, 2008, Washington, DC.


“The Mythology of Arson Investigation,” 2nd ISFI, June 27, 2006, Cincinnati, OH.


“Misadventures in Fire Investigations: Common Features, Common Errors, and How to Spot a Dog,” AAFS, Interdisciplinary Session, February 20, 2004, Dallas, TX.


Selected Media Appearances


“When Forensics Fail,” a National Geographic documentary about the case of Texas vs. Ernest Willis. First aired October 18, 2007. DVD copy available upon request.


Awards

Society of Fire Protection Engineers, 2015 “Person of the Year” Award.
American Academy of Forensic Sciences, Criminalistics Section Special Meritorious Service Award, 2008.
Boy Scouts of America Silver Beaver Award, Atlanta Area Council, 2004.
ASTM E30 Forensic Sciences Award, 1996.