I, Robert Paul Bieber, declare as follows:

A. Professional Background

1. I am a certified fire and explosion investigator (CFEI), certified by the National Association of Fire and Explosion Investigators. I have continuously held CFEI certification since 2003. My specializations include fire cause and origin determination, fire death-scene examination and arson for profit/insurance fraud investigation.
2. In pursuit of those areas of specialization I have worked as a Fire Fighter for San Francisco Fire Department; Fire Investigator for EFI Global, Rocklin, CA; Deputy Coroner for San Mateo County Coroner's Office; and Criminal Fraud Investigator, California Department of Insurance.
3. As a certified fire and explosion investigator I have conducted hundreds of cause and origin investigations regarding accidental and intentionally set fires. I have been involved in determining the cause and the manner of death in every class of suspicious and unattended death, including fire fatalities, and have been the lead investigator on major insurance fraud cases, including insurance fraud investigations regarding arson.
4. I am a licensed Private Investigator in California and an active member of the National Association of Fire Investigators (NAFI) and the International Association of Arson Investigators (IAAI).
5. I hold a Masters of Legal Studies Degree with a concentration in Forensic Investigation (Monterey College of Law, 2011), Bachelor of Science Degree in Criminal Justice (Excelsior College, 2003), and a Certificate in Criminal Investigation with a specialization in Fire and Explosion Investigation (P.O.S.T. Institute of Criminal Investigation, San Jose State University, 2004).
6. I am the director of The Arson Research Project, a criminal justice research project hosted by the Constitutional Law Center of Monterey College of Law. The purpose of The Arson Research Project is to examine the reliability of evidence used in the investigation and prosecution of arson and to identify arson convictions that have been based on unreliable evidence.

B. Bases for Opinion

7. The statements below represent my professional opinions based upon the following review of written reports, photographs and independent research:

8. I have reviewed the Case Activity Report (Case Number 98-1405) of Fire Investigator Jim Holdman, Missouri State Fire Marshal, Department of Public Safety, related to the December 5, 1998 fire incident at Route 1, Box 468, Mineral Point, Missouri;[1]

9. I have reviewed the trial transcripts of Fire Investigator Jim Holdman in prior proceedings (State of Missouri vs. Michael B. Politte, testimony dates January 29 and 30, 2002);

10. I have reviewed photographs and diagrams of the fire scene;

11. My opinions and conclusions have also been influenced and informed by review of NFPA 921, *Guide for Fire and Explosion Investigation* (2014 edition), and fire research conducted by other individuals and organizations.

C. The Conclusions of Fire Investigator Jim Holdman

12. In his Case Activity Report and sworn testimony, Fire Investigator Jim Holdman, Missouri State Fire Marshal, Department of Public Safety, concluded the following:

1) That the fire originated in the bedroom located in the northeast corner of the mobile home. This conclusion was based on his analysis of heat and smoke damage in and near the room of origin.

2) That the specific area of origin of the fire was in the immediate area of where the victim was found inside the bedroom. This conclusion was based on fire pattern analysis and an evaluation of the burn damage, which was isolated to the area where the victim was found.[2]

3) That the fire did not start in any other rooms of the mobile home. This conclusion was based on an examination of the entire building and finding no evidence of fire damage in any other rooms.[3]

[1] J. Holdman, Case Activity Report, Investigation Report (Holdman Report), Case Number 98-1404, Date 12/05/1998.
[2] Holdman Report, at 00810: "The victim was lying just inside the doorway, with feet south closest to the door and head north away from the doorway"; R/T at 276 and 277: "And, again, all that fire damage was contained just to the upper portion of the victim's body itself"; R/T at 278, line 8-11.

4) That all "accidental" or "natural" causes were ruled out and that none of the "electrical items in the bedroom" played a role in the ignition of the fire.[4] This conclusion was based on a "…process of elimination…going through the trailer, looking for natural and accidental possibilities."[5]

5) That a "liquid accelerant" was present on and near the victim that played a role in the ignition and development of the fire. This conclusion was based on his visual examination of the fire patterns and burn damage on and around the victim: *"A floor-level, burn pattern, indicative of poured liquid accelerant burning was found in and around the upper portion of the body, burning through the carpet, wood flooring and heavily charring the floor joists above the right shoulder of the victim."*[6]

6) That the fire was "*incendiary*". This conclusion was based on an *"elimination of all available accidental and natural causes"*; and *"floor-level, burn-patterns, indicative of poured liquid accelerant…"* on and in the area of the victim.[7]

E. Historical Background

13. In 1992 the National Fire Protection Association (NFPA) released its first edition of NFPA 921, *Guide for Fire and Explosion Investigations*. NFPA 921 was developed to assist fire investigators throughout the United States in the investigation and analysis of fire incidents, and to aid in drawing conclusions and rendering opinions as to the fire's origin and cause.

14. NFPA 921 established guidelines and recommendations for the systematic investigation and analysis of fire incidents and contains specific procedures to assist in the collection and analysis of evidence. NFPA 921 emphasizes an understanding of basic fire science, fire dynamics, fire pattern analysis and the scientific method as the underpinnings of a comprehensive and objective cause and origin investigation.

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[3] Holdman Report, at 00809 and 00810: Regarding the living room and dining room, the bedroom in the southwest corner of the building, the bathroom, kitchen and utility room, "No signs of fire origin were found in this area"; R/T at 273.
[4] Holdman Report, at 00810: "No signs of fire origin were found with any of the elctrical items in the bedroom."
[5] R/T at 278, line 1-3.
[6] Holdman Report, page 00810; R/T at 274 and 282, line 10-15; and 283, line 10: "It was clearly evident, again, from the area of origin and the cause that some had intentionally set that fire causing damage to that body."
[7] Holdman Report, page 000811; R/T at 282, line 10.

15. Over the years since its first publication, NFPA 921's influence within the fire investigation community has steadily grown. Now in its eighth edition, NFPA 921 has been formally endorsed and accepted as its standard of practice by both of the nation's largest fire investigator professional associations, the International Association of Arson Investigators (IAAI) and the National Association of Fire Investigators (NAFI).

16. Today, NFPA 921 serves as a de facto Standard of Care on how to conduct a thorough and objective fire or explosion investigation.

F. Area of Origin Determination

17. The purpose of any fire scene examination is to determine the origin, cause and development of the fire.[8] By far, the most important determination is the area of origin – where the fire began.[9]

18. NFPA 921 recognizes the importance of an accurate area of origin determination:

The origin of a fire is one of the most important hypotheses that an investigator develops and tests during the investigation. Generally, if the origin cannot be determined, the cause cannot be determined, and generally, if the correct origin is not identified, the subsequent cause determination will also be incorrect.[10]

19. NFPA 921 defines the *"area of origin"* of a fire as "*[a] structure, part of a structure, or general geographic location within a fire scene, in which the 'point of origin' of a fire or explosion is reasonably believed to be located*."[11]

20. NFPA 921 provides guidance in the methodical examination, analysis and conclusions in determining where a fire began. The overall methodology for determining the origin of the fire is the scientific method.[12]

[8] NFPA 921, *Guide for Fire and Explosion Investigations* (2014), 3.3.67 at 15.
[9] NFPA 921 (2014), 18.1 at 186.
[10] NFPA 921 (2014), 18.1 at 186.
[11] NFPA 921 (2014), 3.3.11 at 14.
[12] NFPA 921 (2014), 18.1 at 186.

21. Only after the area of origin is accurately determined can an examination be undertaken to identify what possible ignition sources, within that area, may have caused the fire. As a result, the core competency of a fire-scene investigator is to reliably and accurately determine the area of origin of a fire.

22. The guide provides four techniques for acquiring data or information in order make this determination: 1) Witness Information; 2) Fire Pattern Analysis; 3) Arc Mapping; and 4) Fire Dynamics.[13]

23. Fire-pattern analysis is a widely accepted method used by the fire investigator in area of origin determination of pre-flashover fires. NFPA 921 defines fire-pattern analysis as *"the analysis of effects and patterns left by the fire"*[14], and *"the process of interpreting fire-patterns to determine how the patterns were created."*[15]

24. The presence, location, shape, color and texture of these patterns can provide the fire investigator with valuable information regarding the location of the burning item or items that created the pattern(s), and in some cases can be used to gain insight into the fire's growth and progression.

25. At this fire, Fire Investigator Holdman determined the fire's room of origin (the bedroom in the Northeast corner of the mobile home) by examining the fire patterns and burn damage in and around the fire scene. His specific area of origin (on the floor of the bedroom, near the doorway, in the immediate area of the victim) was also determined through fire pattern analysis.

26. Secondary to a careful review of Fire Investigator Holdman's written report, testimony and scene photographs, it appears that his area of origin determination – based on a sufficient quantity and quality of fire pattern evidence and a reliable scientific methodology – was in conformance with NFPA 921 and through a process widely accepted in the general fire investigation community.

[13] NFPA 921 (2014), 18.1.2 at 186.
[14] NFPA 921 (2014), 17.12, at 157.
[15] NFPA 921 (2014), 6.1.1, at 43.

I. Fire Cause Determination

27. NFPA 921 defines a fire's cause as *"The circumstances, conditions, or agencies that bring together a fuel, ignition source, and oxidizer (such as air or oxygen) resulting in a fire or a combustion explosion."*[16]

28. In order to determine a fire's cause, an investigator is required to identify the four contributing factors contained in its definition: 1) a competent ignition source; 2) the type and form of the first fuel ignited; 3) the oxidizing agent; and 4) the circumstances that allowed those factors to come together and start the fire.[17]

29. The scientific method is the fundamental methodology required by NFPA 921 in developing a cause hypothesis,[18] and requires that conclusions regarding each of the four causal factors be based on: *"…observation, experiment, or other direct data gathering means. The data collected is called empirical data because it is based on observation or experience and is capable of being verified or known to be true."*[19]

J. Identification of a Competent Ignition Source

30. Fire Investigator Holdman does not identify an ignition source for this fire. The only reference in his report to potential ignition sources is a brief statement where he seems to have examined and eliminated some heat or ignition sources in the room of origin that he determined did not start the fire: *"No signs of fire origin were found with any of the electrical items in the bedroom."*[20]

31. No other evidence or information is provided in Holdman's written report, photographs or testimony with which to determine the ignition source of this fire. Furthermore, no evidence or information is provided to assist in an understanding of how other ignition sources present were eliminated.

32. As a result, the ignition source involved in this fire has not been determined and is unknown.

[16] NFPA 921 (2014), 3.3.64 at 15.
[17] NFPA 921 (2014), 19.1 at 199.
[18] NFPA 921 (2014), 19.2 at 199.
[19] NFPA 921 (2014), 4.3.3 at 18.
[20] Holdman Report, page 00810.

L. Identification of the First Fuel Ignited

33. Although not clearly stated in his written report or testimony, Fire Investigator Holdman implies that the first fuel ignited at this fire were the vapors of a "liquid accelerant" placed on and near the victim laying on the bedroom floor.

34. Fire Investigator Holdman's belief that an ignitable liquid was present was entirely based on his visual examination and interpretation of the fire patterns and burn damage to the victim and the surrounding area: *"Again, with the fire damage to the upper portion of the victim's body, the damage below the right ear, and also the damage to the floor, it was clearly evident that someone had added a liquid accelerant to introduce that to the scene and ignited the accelerant."*[21]

35. NFPA 921 specifically cautions fire investigators that *"fire patterns resulting from burning ignitable liquids are not visually unique,"*[22] and not to base a conclusion regarding the presence or absence of an ignitable liquid on the visual characteristics of the fire patterns: *"Irregular, curved, or 'pool-shaped' patterns on floors and floor coverings should not be identified as resulting from ignitable liquids on the bases of visual appearance alone"*[23]; and *"the determination of the nature of an irregular pattern should not be made by visual interpretation of the pattern alone."*[24]

36. NFPA 921 lists several common household items, including thermoplastics[25] and polyurethane foam,[26] that when burned or melted will produce irregularly shaped fire patterns that can be erroneously identified as ignitable liquid patterns.

37. Because fire patterns and burn damage created by an ignitable liquid are visually indistinguishable from those created by the melting and burning of other common items, NFPA 921 demands laboratory confirmation to validate the presence or absence of an ignitable liquid:

[21] R/T at 282, line 10-15.
[22] NFPA 921 (2014), 6.3.7.8.5, at 72.
[23] NFPA 921 (2014), 6.3.7.8, at 69.
[24] NFPA 921 (2014), 6.3.7.8.5, at 72.
[25] NFPA 921 (2014), 6.3.7.8.6, at 72.
[26] NFPA 921 (2014), figure 6.3.7.8.6(a), at 72.

38. *"In order for the presence or absence of an ignitable liquid to be scientifically confirmed in a sample, that sample should be analyzed by a laboratory in accordance with 17.5.3."*[27]

39. All fire debris samples taken by Fire Investigator Holdman and submitted for laboratory testing came back negative for the presence of an ignitable liquid; specifically, fire debris analysis failed to reveal any evidence of the presence of gasoline.

40. Furthermore, an examination of the scene by an accelerant-detecting canine, trained to alert to trace amounts of gasoline, failed to provide any indication of the presence of an ignitable liquid.

41. In the absence of confirming laboratory results, there is no evidence on which to base a conclusion that an ignitable liquid was present at this fire.

42. As a result, any interpretation by Fire Investigator Holdman that an ignitable liquid was present, in the absence of confirming laboratory analysis, is contrary to the standards expressed in NFPA 921, and not in keeping with the generally accepted techniques and methodologies within the field of fire investigation.

43. The first fuel ignited in this fire has therefore not been determined and is unknown.

M. Circumstances Allowing the Ignition Source to Come in Contact with the First Fuel Ignited

44. The circumstances or agencies that allowed the unidentified ignition source to come into contact with the unknown first fuel ignited were not described in Fire Investigator Holdman's written report or his sworn testimony.

45. In the absence of a reliable determination regarding the ignition source, first fuel ignited, or an understanding of the circumstances that led to ignition, the cause of this fire has not been established.

46. Based on the evidence currently known, and utilizing the methodology for fire cause determination expressed in NFPA 921 and accepted by the broader fire investigation community, the cause of this fire is undetermined.

[27] NFPA 921, 17.5.4.7.1 at 178.

N. Fire Cause Classification

47. The cause of a fire may be classified as accidental, natural, incendiary, or undetermined.[28]

48. In his written report and sworn testimony, Fire Investigator Holdman classified the fire as incendiary: *"From conducting a full investigation…it was clearly evident that it was an intentionally set fire, what we call an incendiary fire."*

49. Fire Investigator Holdman cites *"floor-level, burn-pattern, indicative of poured liquid accelerant burning under the victim on the carpet, through the wood flooring and heavily damaging a floor joist,"* and an *"elimination of all available accidental and natural causes"* as his basis for classifying the cause of the fire as incendiary.[29]

50. In other words, Fire Investigator Holdman classified the cause as incendiary based on his belief that an ignitable liquid was present, and a lack of evidence to support a classification of accidental or natural.

51. At this fire, there is no valid evidence that an ignitable liquid was present. Absent any evidence to support his hypothesis, NFPA 921 precludes Fire Investigator Holdman from drawing a specific conclusion: *"It is improper to base hypotheses on the absence of any supportive evidence. That is, it is improper to opine a specific fire cause, ignition source, fuel or cause classification that has no evidence to support it even though all other such hypothesized elements were eliminated."*[30]

52. Under the circumstances described in the written reports, photographs, and trial transcripts, the only classification for the cause of this fire which is in compliance with NFPA 921 and the standards of generally accepted techniques and methodologies within the field of fire investigation is "undetermined".

53. NFPA 921 explains that *"determining the cause of a fire and classifying the cause of the fire are two separate processes that should not be confused with each other."*

[28] NFPA 921 (2014), 20.1 at 204.
[29] Holdman Report, page 000810.
[30] NFPA 921 (2014), 19.6.5.1 at 203.

54. Understanding the difference between a *"fire cause classification"* and a *"classification of a fire's cause"* can be confusing but is fundamental to understanding the fire investigator's role in drawing expert conclusions based on the application of the scientific method.

55. As explained above, determining the cause of a fire (identifying the ignition source, first fuel ignited and circumstances that brought them together) is one prong of a forensic fire investigation.[31]

56. Also discussed above, the scientific method is the fundamental methodology required by NFPA 921 in developing a cause hypothesis,[32] and requires that conclusions regarding each of the causal factors be based on: *"…observation, experiment, or other direct data gathering means. The data collected is called empirical data because it is based on observation or experience and is capable of being verified or known to be true."*[33]

57. It is the reliance NFPA 921 places upon the scientific method and the expert analysis of empirical evidence required in developing and sustaining a fire cause hypothesis that requires the fire investigator to have scientific, technical and specialized knowledge in order to reliably apply it.

58. The classification of the fire's cause, on the other hand, does not require the application of the scientific method nor does is require the investigator to rely only upon empirical evidence in making that classification.

59. NFPA 921's chapter 20 –*Classification of the Fire Cause*, chapter 21 –*Analyzing the Incident for Cause and Responsibility*, and chapter 24 –*Incendiary Fires*, make no mention of the scientific method. No general methodology is offered to assist the fire investigator in classifying the fire's cause.

[31] NFPA 921, 3.3.67 at 15: Defines a Fire Investigation as "the process of determining the origin, cause and development of a fire or explosion."
[32] NFPA 921 (2014), 19.2 at 199.
[33] NFPA 921 (2014), 4.3.3 at 18.

60. Instead, NFPA 921 provides a long list of fire and non-fire related indicators that can be used to infer if a fire was deliberately set.[34] Although the presence or absence of one or more of these indicators may offer circumstantial evidence regarding intent or motive, the evaluation of these indicators does not require any form of scientific, technical or specialized process and does not form the basis of an expert opinion.

61. NFPA 921 defines an *incendiary* fire as *"...a fire that is **deliberately** set with the **intent** to cause a fire to occur in an area where the fire should not be,"*[35] whereas an *accidental* fire is one where *"...the proven cause does not involve an **intentional human act** to ignite or spread (the) fire..."*[36] It goes on to say that *"when the **intent** of the person's action cannot be determined or proven to an acceptable level of certainty, the correct classification is undetermined."*[37]

62. Therefore, to understand the correct classification, the investigator must first determine the cause of the fire (ignition source, first fuel ignited and circumstances bringing them together), and then evaluate the mental state of the person or persons responsible for the fire's ignition.

63. Fire Investigator Holdman's classification of the fire as incendiary requires him to push his expert conclusions well beyond the determination of the origin, cause or development of the fire. In classifying the cause of the fire, Fire Investigator Holdman must judge the *human intent* that was present or absent when the fire was first ignited.

64. Fire Investigator Holdman's evaluation of the mental state of a person igniting a fire is far outside his expertise as a fire investigator and beyond the scientific methodologies provided by NFPA 921.

[34] NFPA 921 (2014), chapter 24, at 237-243.
[35] NFPA 921 (2014), 20.1.3, at 204 (emphasis added).
[36] NFPA 921 (2014), 20.1.1, at 204 (emphisis added).
[37] NFPA 921 (2014), 20.1.1, at 204 (emphasis added).

P. Conclusions

65. The purpose of Fire Investigator Holdman's fire scene examination was to determine the origin, cause and development of the fire through the application of the scientific method.

66. His conclusion that the fire originated on the floor of the bedroom, in the immediate vicinity of the victim, was based on fire pattern analysis. This conclusion appears to be based on a sufficient quantity and quality of evidence to allow a determination of the area of origin to be expressed to a reasonable degree of certainty.

67. Fire Investigator Holdman failed to identify the ignition source, first fuel ignited or the circumstances leading to the ignition sequence that caused this fire. His written report and testimony fail to provide any information on these important issues.

68. His conclusion that an ignitable liquid was present was based entirely on his interpretation of the visual characteristics of the fire patterns and burn damage in and near the area of origin. Establishing the presence or absence of an ignitable liquid based only on a visual examination of the burn damage is not in compliance with NFPA 921 and not an accepted practice amongst the general fire investigation community.

69. At this fire, where an examination of the fire scene by an accelerant detecting canine and laboratory examination of fire debris samples were all negative for the presence of an ignitable liquid, there is simply no evidence to support Fire Investigator Holdman's conclusion.

70. Any conclusions regarding the cause of this fire other than "undetermined" are not in compliance with NFPA 921; are not consistent with the scientific method; are not in keeping with generally accepted techniques and methodologies within the field of fire investigation; and are not supported by the evidence currently known.

71. Fire Investigator Holdman's classification of the cause of the fire as incendiary was based on his unconfirmed belief that an ignitable liquid was used. Moreover, his classification of the cause of the fire required him to analyze and measure the human intent and deliberation that was present or absent when the fire was first ignited.

72. Any classification of the fire's cause requiring an interpretation, analysis or measurement of human intent or deliberation is not based on the scientific method and is beyond the expertise of a fire investigator to opine.

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