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Via Hand Delivery

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Re: Inmate Kevin Cooper's Clemency Request – Response To July 3 Letter

Dear Mr. Krause:

Mr. Cooper and his defense team appreciate the opportunity to respond to the questions in your July 3 letter, and thank you for the serious attention and considered review you, the Governor and his staff are giving the significant issues in Mr. Cooper's clemency petition. Nothing could be more important to the integrity of our justice system than ensuring that an innocent person is not executed. Moreover, nothing could justify a failure to take all available steps to conclusively resolve legitimate questions regarding innocence or guilt before putting someone to death. There remain many legitimate and troubling questions regarding Mr. Cooper's innocence, and there are readily available means to conclusively answer those questions. As the Governor is no doubt aware, Pope Francis recently declared the death penalty wrong in all cases. However, it is particularly abhorrent in a case where innocence is involved. All that Mr. Cooper requests is the full and fair opportunity to prove that he is innocent.

We hope the discussion below, along with Mr. Cooper's substantial submissions in his clemency petition, demonstrate that this situation demands further and immediate action in the form of an innocence investigation that includes advanced forensic testing.

Mr. Cooper Seeks An Innocence Investigation Of Which DNA Testing Is An Important Part.

Advanced, scientifically reliable DNA testing is now available that can provide forensic evidence demonstrating Mr. Cooper's innocence. That testing is discussed below in response to the questions in your July 3 letter. In conjunction with that testing, Mr. Cooper seeks a broader innocence investigation to be overseen by a Special Master appointed by the Governor, and undertaken pursuant to the investigative authority of the Board of Parole Hearings (BPH). The Governor has broad authority to direct the BPH to conduct investigations in connection with clemency petitions and related matters. For instance, two of the several categories of investigations the BPH Investigations Division can undertake at the Governor's direction are:[1]

> **Governor's Investigations** - Information/data required for this type of investigation varies depending on the type of investigation and specifics of the

[1] See https://www.cdcr.ca.gov/BOPH/investigations.html.

> request. These cases can include clemency requests based on innocence or special circumstances.
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> **Death Penalty Investigations** - Upon receipt of a petition for clemency, the Governor may request that the Board investigate and make a recommendation to assist in determining whether to grant a reprieve or executive clemency.

To these ends, BPH has broad statutory authority to take testimony, issue subpoenas, make findings and recommendations, and to "take all action necessary to conduct a full and complete investigation." (See, e.g., Cal. Penal Code § 4812; Title 15 CCR § 2816(b).)

Mr. Cooper requests that the Governor appoint a Special Master to work collaboratively with the BPH. The Special Master would manage and oversee the day-to-day activities of the innocence investigation on behalf of the BPH. Mr. Cooper's defense team has consulted with several distinguished jurists, both active and retired, who are willing to act as the appointed Special Master, if the Governor so chooses. Each, Mr. Cooper believes, would objectively and fairly oversee an innocence investigation and forensic testing, and would work effectively with the BPH representatives. Mr. Cooper's defense team will share the names of those who have been identified to potentially serve as a Special Master upon your request.

Within the context of the innocence investigation, with the assistance of a Special Master, Mr. Cooper seeks access to critical documents and physical evidence that have been previously denied to him. In particular, as listed in Appendix D to the clemency petition, Mr. Cooper seeks access to documents and evidence in the possession of the San Bernardino County Sheriff's Department (SBSD), San Bernardino County District Attorney's Office, and the Scripps Institute laboratory, all of which can support his innocence claim. (See Clemency Petition ("Petition"), p. 162 & Appendix D).

Existing historical information is available to show Mr. Cooper's innocence, but it is not the only information that is or may become available. In fact, evidence of Mr. Cooper's innocence continues to be discovered and more is expected. Most recently, two witnesses have come forward with details of separate confessions by individuals who likely committed the Ryen/Hughes murders, including one whom Mr. Cooper has consistently identified as the actual perpetrator. (See response to Question No. 19.) A Special Master can take testimony and weigh credibility of witnesses to arrive at conclusions of innocence or guilt.

The new evidence that exists, the new evidence that will come out through a Special Master's efforts, the long standing evidence that undermines the California Supreme Court's 1991 decision upholding Mr. Cooper's conviction and demonstrates the corrupt prosecution that led to Mr. Cooper's conviction, as well as the findings of due process violations compiled by the Inter-American Commission on Human Rights

(IACHR)[2], all demand that Mr. Cooper be granted clemency in the form of a full and fair investigation of his innocence. Former prosecutor Gil Garcetti said it well in his August 13, 2018 letter to Governor Brown in support of Mr. Cooper's requested innocence investigation and testing: "It is exceedingly rare for a former county district attorney to urge the action we hope you shall order. But the facts, and lack of facts, in this case have motivated me to ask for your assistance in ordering the advanced DNA testing that could prove Mr. Cooper's innocence." An execution is permanent; any delay or inconvenience resulting from an innocence investigation and testing pales in comparison to the consequences of being wrong.

Under Today's Standards, The Prior Forensic Testing In Mr. Cooper's Case Is Neither Conclusive Nor Reliable Evidence Of His Guilt.

In opposing Mr. Cooper's clemency petition, and his requests over the last decade for further forensic testing, the State has repeatedly relied on the DNA test results from 2002 that purport to inculpate Mr. Cooper. The State contends that those test results "conclusively" establish Mr. Cooper's guilt. Those DNA test results, however, and the processes used to obtain them, should not be considered reliable, much less conclusive, under the advanced scientific technology in existence and available today. In fact, under the forensic standards currently approved and used by the California Department of Justice, Bureau of Forensic Services, the 2002 testing procedures and results could be considered unreliable and be reinterpreted to be non-conclusive of Mr. Cooper's guilt. The Governor should not rely on those tests to conclude Mr. Cooper's guilt has been forensically confirmed, or to deny Mr. Cooper's present request for an innocence investigation with advanced forensic testing.

Much has changed since the 2002 DNA testing was done in this case. First, new test methods can reliably detect DNA in a sample at much lower levels than was possible in 2002. The tests are now so sensitive that samples with low levels of DNA, often called "touch DNA,"[3] can be tested. Any sample, including from blood stains, can yield low levels of DNA that are similar to the amount of DNA left by a person simply

[2] As fully discussed in Mr. Cooper's clemency petition, in addition to the IACHR due process findings, Mr. Cooper has identified at least six *Brady* violations that occurred in securing his conviction. (1) The prosecution's failure to disclose that Warden Midge Carroll contacted SBSD to inform them that PRO-Ked Dude shoes were not solely available in prisons; (2) destruction of the bloody coveralls; (3) failure to produce the "disposition report" showing supervisor approval for destruction of the coveralls; (4) failure to produce the blue shirt and then apparently destroying it; (5) failure to disclose the dispatch log and related documents evidencing the recovery of the blue shirt; and (6) failure to disclose the SBSD internal discussions regarding sightings of three strangers in the Canyon Corral Bar the night of the murders. (See Petition, pp. 80-81, 210, 212, 223, 225-27.)

[3] The term "touch DNA" began to be used when laboratories started testing samples that did not appear to be visibly stained with blood or other biological fluids. The original DNA method of RFLP (Restriction Fragment Length Polymorphism) testing required large quantities of DNA that could not be obtained absent the presence of body fluids. With the advent of PCR (Polymerase Chain Reaction) technology, analysts began successfully testing items thought to have been touched by an individual, which resulted in the use of the "touch DNA" term.

touching an object. Because of the increased sensitivity of these tests, DNA left by the act of wearing an item of clothing, for instance, can be detected in a much more reliable manner.

Second, the forensic community has come to recognize that substantial issues of unreliability arise when testing certain types of low level DNA samples with prior technology. This is particularly true with samples that exhibit what is called "stochastic effects." Stochastic effects on data result in test results that include a loss of information, or allelic drop-out, which leads to the failure to detect some or all of the alleles of a true donor and, therefore, less-reliable identification. As described below, the 2002 testing in this case was necessarily impacted by stochastic effects, and the reliability of the results are correspondingly decreased under today's standards.

Third, both the science of mixture interpretation and the statistical analysis of mixtures have dramatically changed. This aspect of DNA testing was central to the 2002 testing in Mr. Cooper's case. Since 2002, most laboratories, including the California Department of Justice laboratory, have instituted much more rigorous interpretation guidelines for mixture analysis, particularly those with low levels of DNA. Some laboratories, most notably the San Diego Police Crime Lab, have begun to reexamine identification conclusions drawn on mixed samples because in many cases the application of the new interpretation guidelines may change an opinion that someone is included in a sample to an opinion that the data is actually inconclusive.[4] The more rigorous interpretation standards produce more reliable test results that lessen the chance of including an innocent person in a sample result where they scientifically do not belong.

In Mr. Cooper's case, the testing conducted by the California Department of Justice in 2002, using the Profiler Plus chemistry, yielded data derived from low level DNA samples. The test results from all of the samples from the tan t-shirt (DOJ-6F, DOJ-6G, DOJ-6I, DOJ-6J and DOJ-6K) derived from low level mixtures of DNA. A review of the data shows that much of the data was impacted by "stochastic effects" and exhibit allelic drop-out (loss of data). Application of the newer guidelines to this data could well lead to the opinion that some, if not all of the results from the tested samples, were inconclusive. Had the 2002 DNA test results been judged inconclusive, the argument on which the State continually relies – that the 2002 testing on the tan t-shirt, cigarette butts and blood spot A-41 conclusively proved Mr. Cooper's guilt - collapses. Additionally, the laboratory appears to have used a method of interpretation that subsequently has been rejected by the forensic community in applying a statistical analysis to samples that exhibit stochastic effects. Inclusion of this impacted, low level data in the statistical analysis based on the 2002 test results could, under today's methodologies, lead to a statistical analysis more favorable to the defendant, which again undermines the weight of the conclusions made in 2002 based on the prior DNA testing.

Even putting aside the uncertainties regarding the integrity of the evidence that was tested, and the integrity of the testing process itself, the 2002 test results cannot be accurately described, under today's improved

[4] See http://www.sandiegouniontribune.com/news/courts/sd-me-da-dna-20180125-story.html.

DNA science, as conclusively confirming Mr. Cooper's guilt in these crimes. On the contrary, legitimate, important questions as to his innocence or guilt remain, including with respect to the informative value of the 2002 test data and results.

The Governor Has A Special Duty To Act When There Is Compelling Evidence Of Innocence That Has Not Been Fully Examined.

Despite a huge incarceration rate[5] and a history of wrongful convictions, California does not have a commission charged with investigating post-conviction claims of factual innocence.[6] California also does not have a commission or scientific body dedicated to forensic science reform, such as exist in Texas, Illinois, New York and Wisconsin. The mission of these commissions is to reinvestigate cases like Mr. Cooper's in which the convicted person asserts factual innocence and the forensic science used to win the conviction lacks integrity and/or the prosecution experts who testified were unqualified.

Such commissions are important and effective. For instance, on July 20, 2018, the Texas Forensic Science Commission ruled that the scientific findings in the case of Joe Bryan, who has spent the last 30 years in prison, were not reliable and that the testimony of the state crime lab technician was "entirely wrong." The commission, created by the Texas Legislature in 2005, is made up of seven scientists, one prosecutor and one defense attorney. It has emerged over the past decade as one of the most influential criminal investigative bodies in the country and, in 2016, called for a widely-followed moratorium on the use of bite-mark evidence. In the *Bryan* case, the commission is expected to recommend that DNA analysis proceed on previously untested evidence, testing that the State has been refusing to conduct for many years. (See New York Times, July 24, 2018, at https://www.nytimes.com/2018/07/24/us/joe-bryan-blood-spatter.html.)

Mr. Cooper is in a similar situation to Mr. Bryan. Both men have steadfastly maintained their innocence for over 30 years; both men were convicted on the basis of questionable blood analysis; both men continue to seek testing that the state has managed to block; and both convictions are based on the testimony of a law enforcement officer with minimal training.[7]

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[5] California's prison population is at 115,000 inmates, according to the Public Policy Institute of California website at http://www.ppic.org/publication/californias-changing-prison-population/.

[6] States that have innocence commissions that are empowered to investigate alleged wrongful convictions include North Carolina, New York, and Illinois. While several states have commissions to study the causes of wrongful convictions, fewer actually review active claims of innocence.

[7] As a result of the *Bryan* case, the Texas commission is seeking to end the practice of allowing law enforcement criminalists with minimal training to testify on complicated blood analysis, requiring instead that such analysis be performed by an accredited laboratory, if the evidence is to be allowed in court at all. In Mr. Cooper's case, the only piece of direct evidence allegedly linking Mr. Cooper to the crime scene was a drop of blood. Daniel Gregonis, the SBSD criminalist that performed the blood analysis, altered his lab results. (See Petition, pp. 67-68, 98-101). Mr. Gregonis was also the lab technician in the case of William Richards, whose conviction in San Bernardino County was overturned in May 2016 based in part on the

But Mr. Cooper does not have the benefit of an authoritative commission to consider his case. In California, where no innocence or forensic science commission exists, the Governor is the final "fail-safe" who must ensure that potentially wrongful convictions based on questionable evidence are properly evaluated, and that a petitioner with a legitimate innocence claim is provided a full and fair opportunity to prove his innocence. The Governor has been given broad constitutional clemency authority for this purpose.

The structure and review of a clemency petition is unique – clemency is a purely executive function provided for in the California Constitution. It is not part of the criminal justice process. Clemency is designed as an independent, final "fail-safe" to correct miscarriages of justice when the criminal justice system has failed – either at trial (because of racial prejudice, misdeeds by prosecution and/or incompetent defense), or in post-conviction proceedings (because of failures by appellate courts and structural hurdles the system places in front of a wrongfully convicted person.) A review of the clemency petition in this case must begin with an acknowledgement that prior judicial proceedings could have been unfair for various reasons, including due to misconduct by the prosecution and law enforcement, or errors by judges at the trial or appellate level. The fact that Mr. Cooper's case has been reviewed by courts under mandated legal standards has no bearing on the merit of his clemency petition, which is based on evidence of factual innocence. Mr. Cooper's petition raises new evidence supporting his innocence, demonstrates that prior evidence of his guilt has been discredited, and details the bias of the district court who improperly obstructed and denied Mr. Cooper the full and fair hearing and forensic testing that had been ordered by the Ninth Circuit.[8]

Thus, Mr. Cooper's case is precisely the situation for which executive clemency is intended: where there is strong evidence of innocence yet the criminal justice system has failed to fully and fairly evaluate that evidence. Executive powers of clemency are the last safeguard to prevent the unfair treatment of defendants by the state. The clemency power is even more critical given the severe legal and evidentiary hurdles imposed on post-conviction legal reviews by the passage of the Anti-Terrorism and Effective Death Penalty Act (AEDPA) in 1996. The AEDPA and the Supreme Court of the United States' interpretation of it has effectively gutted habeas corpus protections, which in the past resulted in a high percentage of death sentence reversals. As a result of the AEDPA, the reversal rate of state courts in death penalty cases has been reduced by about 40 percent, although there is no corresponding evidence that the rate of wrongful convictions has similarly decreased. (See "The Destruction of Defendants' Rights, the New Yorker, June 21, 2015, at https://www.newyorker.com/news/news-desk/the-destruction-of-defendants-rights.) Actual innocence claims are even less likely to be successful in the courts, as the AEDPA and related jurisprudence limit post-conviction challenges to fair trial and other legal issues, and correspondingly have

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likelihood that incriminating evidence was planted during the criminal investigation. (See *In re Richards*, 63 Cal.4th 291 (2016).)

[8] Judge Fletcher observed: "There is no way to say this politely. The district court failed to provide Cooper a fair hearing and flouted our direction to perform the two [DNA] tests…[and] impeded and obstructed Cooper's attorneys at every turn as they sought to develop the record." (Petition, Ex. 1 [*Cooper v. Brown*, 565 F.3d 581, 583 (9th Cir. 2009) (Fletcher, dissenting)].)

raised nearly insurmountable obstacles for courts to hear, much less grant, claims of factual innocence. The demise of habeas corpus protections and the obstacles confronting factual innocence claims make it even more imperative that the Governor be vigilant in the exercise of his clemency power.[9]

A Brief Response To The Discredited And Misleading Arguments Advanced By The State That Are Summarized In The July 3 Letter.

Several erroneous assertions that the State has repeatedly made in opposing Mr. Cooper's innocence claim are summarized in your July 3 letter. To avoid any implication that the State's assertions are valid, Mr. Cooper briefly addresses them.[10]

Your July 3 letter summarizes the State's characterization of the case history and repeats the State's mantra that "every court that has reviewed the case has found overwhelming evidence of guilt." That is incorrect and distorted. In 2009, based on the compelling evidence of his innocence, eleven judges of the Ninth Circuit Court of Appeals concluded that Mr. Cooper should have a fair hearing as to his innocence and expressed grave doubt as to his guilt. Five judges, who joined Judge Fletcher's 103-page dissent to the denial of rehearing *en banc*, concurred in the statement that "The State of California may be about to execute an innocent man."[11]

In 2015, an independent, impartial body that reviews claims of injustice agreed with these judges that Mr. Cooper has been denied a meaningful opportunity to prove his innocence. The IACHR, an agency of the Organization of the American States, issued a lengthy report in which all six IACHR commissioners found Mr. Cooper's human rights were violated during his prosecution and sentencing. The commissioners who heard Mr. Cooper's case are expert lawyers trained in investigating and making findings relating to human rights violations under international law. Thus, the most recent judicial reviews of Mr. Cooper's case support his innocence claim.

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[9] There can be no dispute that innocent people have been convicted in California and have faced huge obstacles in proving their innocence. The recent cases of William Richards (in San Bernardino County), Craig Coley, and Vicente Figueroa Benavides are but three examples of innocent men wrongfully convicted who spent decades in prison because the judicial system would not or could not reasonably consider their claims. (*See In re Richards*, 63 Cal.4th 291 (2016); *In re Figueroa*, 4 Cal.5th 576 (2018).) In Mr. Coley's case, the Governor used his clemency authority to order an investigation in which advanced DNA testing exonerated him, leading to the Governor's pardon in November 2017.

[10] Note: the Clemency Petition is a detailed, 235-page document that includes links to all the exhibits and transcripts. If there is any discrepancy in the discussions in this letter and the Petition, the Petition should be considered the controlling document.

[11] In a speech to New York University Law School (Oct 15, 2013), printed in NYU Law Review (June 2014) on "Our Broken Death Penalty," Judge Fletcher stated that Mr. Cooper "is on death row because the San Bernardino Sheriff's Department framed him."

Your July 3 letter also repeats the State's misleading assertion that two "unsuccessful clemency petitions" were made to Governor Schwarzenegger. Actually, Governor Schwarzenegger had a major change in his view of Mr. Cooper's case between the filing of the first petition (2004) and the second petition (2010). Shortly before leaving office in January 2011, Governor Schwarzenegger wrote that Mr. Cooper's second "clemency application raises many evidentiary concerns [that] deserve a thorough and careful review of voluminous records. Such an extraordinary request needs more than two weeks' attention." This cannot be fairly characterized as an "unsuccessful" petition. Indeed, Governor Schwarzenegger was urging Governor Brown to do a "thorough and careful review" of Mr. Cooper's case.

The July 3 letter also repeats the State's misleading assertion that the evidence against Mr. Cooper "clearly shows" his guilt. As detailed in Mr. Cooper's clemency petition, much of the evidence against Mr. Cooper, and in particular, the key evidence relied on by the Supreme Court of California in upholding his conviction, has been substantially undermined and discredited. (See Petition, pp. 93-108.)

Last, the State's frequent claim that Mr. Cooper has a "violent criminal history" is based on arrest warrants for alleged actions for which he was never tried or convicted. Mr. Cooper had never been tried for or convicted of a violent crime prior to his conviction for the Ryen/Hughes murders. In 1982, a warrant was issued for his arrest that included an alleged sexual assault, though Mr. Cooper was never charged or tried. In July 1983, Mr. Cooper was arrested for an alleged rape when a man discovered Mr. Cooper and his wife having consensual sex. Mr. Cooper was arrested on the basis of this accusation but was never charged with this offense. The State's continual attempt to portray Mr. Cooper as having a violent criminal history based on arrests and allegations is contrary to the fundamental principle that a person is presumed innocent and not deemed guilty of or punished for a crime unless and until he is convicted.

Mr. Cooper's Responses To The Questions In The July 3 Letter

Mr. Cooper's responses to the questions in the July 3 letter follow. Much of the information is extensively presented in the clemency petition, which is also at times cited herein. Mr. Cooper's defense team stands ready to provide immediately any additional information the Governor requests, and to begin immediately the requested innocence investigation and forensic testing.

1) With respect to every piece of evidence you want tested in this case, describe with particularity:

- **i. the current location of the evidence;**
- **ii. what kind of testing you want performed;**
- **iii. how you want the test performed (*e.g.*, for the tan t-shirt, describe what portion of the t-shirt would be tested, the manner in which the test would be performed, etc.);**
- **iv. what information you believe new DNA testing would yield that was not already provided by previous testing.**

(1) Mr. Cooper proposes to use state-of-the-art STR (short tandem repeats) DNA testing and the most advanced DNA recovery methodology, M-Vac, where appropriate. As detailed below, Mr. Cooper has retained Sorenson Forensics in Salt Lake City, Utah, a fully-accredited forensic laboratory with extensive experience using these advanced forensic methodologies.

DNA testing in 2002 and 2004 relied on Profiler Plus STR chemistry.[12] Mr. Cooper will use the updated and more sensitive STR chemistry now available, called GlobalFiler. GlobalFiler STR chemistry is estimated to be five to six times more sensitive than Profiler Plus chemistry, and is the current forensic DNA methodology used by the California Department of Justice, Bureau of Forensic Services. (See Attachment 1 [California DOJ, BFS brochure][13].) Rather than 10 genetic markers identified by Profiler Plus used in 2002, GlobalFiler STR chemistry identifies 24 distinct genetic markers, thereby providing a far more discriminating and reliable DNA profile.

DNA recovery technology has also advanced exponentially over the last 16 years. To collect DNA samples, Mr. Cooper proposes to use the M-Vac device on appropriate items of evidence, in addition to the traditional methods of swab and cutting collection. The M-Vac method is an advanced technology that utilizes a wet-vacuum tool that can recover DNA from rough or porous items of evidence, such as clothing, leather, or similar material, even when the DNA deposit may be minute or degraded. The M-Vac device dispenses a sterile collection solution onto a sample under pressure, simultaneously collects the solution from the surface with vacuum force, and then isolates the collection solution and surface particulate in a collection bottle. Sorenson Forensics was the first accredited laboratory in the United States to validate and use the M-Vac device, and has been using the M-Vac since 2010 to produce successful results where other collection methods may fall short. (See Attachment 2 [summary of 2012 Boston University School of Medicine study analyzing the M-Vac compared to other DNA collection methods].)

Certain items of evidence (such as the female victims' fingernail scrapings) may be appropriate for Y-STR analysis. Y-STR technology specifically targets DNA located on the Y chromosome, i.e., male DNA only.

To ensure reliable comparisons between DNA profiles, Mr. Cooper also proposes to reanalyze the victims' and Mr. Cooper's blood to establish their DNA profiles. Using GlobalFiler STR, the DNA profile for each individual will include the full series of genetic markers now available with current technology (i.e., 24 markers in GlobalFiler STR vs. 10 markers in Profiler Plus). In this way, reliable comparisons between DNA recovered from items of evidence and the DNA profiles of Mr. Cooper, the victims, Lee Furrow, and/or available profiles in law enforcement or private DNA databases will be assured.

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[12] As discussed above (pp. 3-5), the 2002 testing methodology and the conclusions based on that testing should not be considered reliable or conclusive under current standards.

[13] See https://oag.ca.gov/bfs.

Immediately below, Mr. Cooper details the proposed DNA collection and testing methods for each item of evidence Mr. Cooper seeks to test, what Mr. Cooper expects testing to demonstrate that was not provided by prior testing, and the current location of the evidence to the extent known to Mr. Cooper.[14]

The Tan T-Shirt (believed to be stored at the California Department of Justice Crime Laboratory, Richmond, CA)

Mr. Cooper proposes to test the tan t-shirt to determine the "wearer" DNA, i.e., the DNA of the person who wore the t-shirt during the crimes and then discarded it on a roadside near the crime scene and the Canyon Corral Bar where it was found on June 7, 1983. Sorenson Forensics will collect DNA samples from the inside of the collar and underarm areas using the M-Vac device, as well as by swabbing. (Mr. Cooper's defense team is prepared to pay for multiple tests and/or methodologies for each item of evidence in order to maximize the likelihood of obtaining conclusive results.) The DNA samples collected from the t-shirt will be analyzed using GlobalFiler STR chemistry. If it appears it would be helpful, Y-STR chemistry could also be used to specifically target male DNA recovered from the t-shirt.

In 2002, testing for "wearer" DNA using cuttings from the t-shirt and the Profiler Plus STR chemistry was unsuccessful. GlobalFiler STR chemistry is five to six times more sensitive than Profiler Plus in identifying the DNA markers that allow identification. In addition, the M-Vac collection methodology is particularly well-suited for the tan t-shirt as it is much more effective at recovering DNA from even small or degraded deposits on porous material such a cloth. (See Attachment 2.)[15] Using the combination of M-Vac collection and GlobalFiler STR chemistry, Mr. Cooper expects that a reliable and conclusive DNA profile can be obtained from the "wearer" of the tan t-shirt. To be as thorough as possible, Mr. Cooper will also collect DNA by swabbing the relevant areas on the t-shirt and will analyze those samples with GlobalFiler STR chemistry.

Obtaining the DNA profile of the "wearer" of the tan t-shirt could conclusively exonerate Mr. Cooper. As noted below in response to Question 9, Mr. Cooper's defense team has possession of a DNA sample from Lee Furrow, a convicted killer to whom evidence points as one of the likely killers in this case. (See Petition, pp. 12, 48 -50, 63, 71, 85.) The destruction of Furrow's bloody overalls (and failure to have them tested) by the SBSD were among the grounds cited by the Ninth Circuit in staying Mr. Cooper's scheduled execution in February 2004. (See *Cooper v. Woodford*, 358 F.3d 1117 (9th Cir. 2004).) After Sorenson Forensics obtains the "wearer" DNA profile from the t-shirt (and the other results discussed herein), Mr. Cooper will submit Furrow's DNA sample for analysis. Mr. Cooper expects that the DNA profile from the

[14] The State has had continuous custody of the evidence. Mr. Cooper's defense team is not certain where each item is currently located.

[15] Additional detailed information regarding the M-Vac system can be found at http://www.m-vac.com/index.jsp.

"wearer" of the t-shirt will match the DNA profile from the sample obtained from Furrow. That outcome would be indisputable evidence conclusively establishing Mr. Cooper's innocence.[16]

If the "wearer" DNA profile does not match Furrow, it should be run through the Combined DNA Index System (CODIS) or other law enforcement and private DNA databases for a potential match. As Mr. Cooper understands it, the CODIS database operates in conjunction with the CAL-DNA database established by the California Department of Justice, Bureau of Forensic Services. The "wearer" DNA profile could also be compared with DNA profiles obtained from other evidence connected to these crimes, such as the orange towel, hatchet handle, hatchet sheath, etc., all discussed below. Proving a correlation of a DNA profile among multiple items of evidence known to be related to the crimes, but not matching Mr. Cooper, would also be compelling evidence that he did not commit these crimes.

The Orange Towel (believed to be stored at the San Diego County Courthouse or the San Bernardino County Crime Laboratory)

Mr. Cooper proposes to test the orange towel to determine who handled the towel prior to discarding it on the roadside. Sorenson Forensics will use the M-Vac collection method to recover any available DNA from the towel, and analyze those samples using GlobalFiler STR chemistry. Y-STR chemistry could also be used to specifically target male DNA that may be recoverable from the towel.

The orange towel was found on the roadside next to the tan t-shirt on June 7, 1983. The towel matched the size, color and brand of a hand towel found in the Ryen home, and in all likelihood was thrown on the roadside by the perpetrator while discarding the tan t-shirt. Testing of the orange towel with methods available in 1983 did not produce meaningful results, and no further forensic testing of the towel has occurred (to Mr. Cooper's knowledge).

Using today's advanced DNA recovery and analysis methodologies, there is a strong probability that the DNA profile of the person who handled and discarded the towel after committing these crimes can be obtained. As with the tan t-shirt, matching that DNA profile to Furrow's DNA (which Mr. Cooper's defense team has obtained) would be conclusive evidence of Mr. Cooper's innocence. In the event the DNA profile obtained from the orange towel did not match Furrow (or Mr. Cooper), that profile could also be compared to other items of evidence in this case and run through the CODIS database and/or private DNA databases. A match from the available databases or correspondence among multiple items of evidence known to be related to the crimes would also be compelling evidence that someone other than Mr. Cooper committed these crimes.

[16] And should the "wearer" DNA profile match Mr. Cooper, as the State contends it should, then that result would also be conclusive.

The Hatchet Handle (believed to be stored at the San Diego County Courthouse)

Mr. Cooper proposes to test the handle of the hatchet found in a field near the crime scene to identify the assailant who wielded the weapon in committing the crimes and/or the historical owner/user of the hatchet. Sorenson Forensics will attempt to recover usable DNA samples by swabbing the hatchet handle and using the M-Vac device. DNA samples will be analyzed using GlobalFiler STR chemistry. Y-STR chemistry could also be used to specifically target male DNA recovered from the hatchet handle.

SBSD recovered the hatchet on June 5, 1983, on the side of the road traveling away from the Ryen residence. Fingerprint testing conducted on the hatchet in 1983 utilized a chemical process that covered and permanently darkened the hatchet handle. While this processing altered the color of the handle and prevented effective serological testing in 1983, that chemical layer deposited in 1983 may have preserved DNA that was present on the handle and remains available today under the chemical layer. Using swabbing and M-Vac recovery and GlobalFiler STR chemistry, Sorenson Forensics may be able to recover usable DNA and successfully separate the DNA from the fingerprint chemical to generate a DNA profile from the hatchet handle.

A DNA profile from the hatchet handle could conclusively exonerate Mr. Cooper. If, as Mr. Cooper believes, this hatchet belongs to Furrow and was used by Furrow to commit these crimes, a DNA profile obtained from the handle will confirm that fact, even if Furrow used gloves during the commission of the crimes. In the event the DNA profile comes back "unknown," it could be compared to DNA profiles contained in law enforcement and private DNA databases, as well as DNA profiles obtained from other evidence connected to these crimes, such as the tan t-shirt, hatchet sheath and orange towel. A match of DNA profiles among multiple items of evidence known to be related to the crimes, but not matching Mr. Cooper, would be compelling evidence that he was not involved. DNA obtained from the hatchet handle could also disprove that the hatchet came from the house where Mr. Cooper stayed after escaping from Chino prison (the hideout house), which theory was heavily relied on by the prosecution to tie Mr. Cooper to the crimes.[17]

The Hatchet Sheath (believed to be stored at the San Diego County Courthouse)

Mr. Cooper proposes to test the hatchet sheath that mysteriously appeared on June 7, 1983 in the hideout house after a prior inspection did not find it. DNA recovery would include swabbing the snap closure of the sheath, and swabbing and using the M-Vac device on the leather body of the sheath. Recovered DNA would be analyzed using GlobalFiler STR chemistry. Y-STR chemistry could also be used to specifically target male DNA recovered from the hatchet sheath.

[17] A DNA sample obtained from the owners of the hideout house (Mr. and Mrs. Lease, Mr. and Mrs. Lang) could be compared to the DNA profile recovered from the handle, in the event the profile does not match Furrow (or Mr. Cooper).

Employees of the owner of the hideout house discovered the hatchet sheath lying in open sight on the floor of an empty bedroom, one day after detectives had searched the house without noting any evidence related to the crimes. DNA obtained from the sheath could identify the owner of the hatchet and/or the assailant who removed the sheath from the hatchet. As with the hatchet handle, a DNA profile obtained from the sheath that matches Furrow's DNA profile would conclusively exonerate Mr. Cooper. In the event it did not match Furrow (or Mr. Cooper), the DNA profile from the sheath could be run through DNA databases, and also compared to DNA profiles obtained from the tan t-shirt, orange towel and hatchet handle, as a match would strongly demonstrate someone other than Mr. Cooper committed the crimes. Lastly, assuming the sheath was planted by authorities as Mr. Cooper asserts, with additional investigation a DNA profile from the sheath could identify the individual who planted it.

Untested Hairs Clutched in Victims' Hands (believed to be stored at the California Department of Justice Crime Laboratory, Richmond, CA)

Mr. Cooper proposes to examine and test hairs collected from the victims' hands and the crime scene that previously have not been tested. The hairs would first be examined to identify human hairs with root viability. Hairs with root material would be analyzed for DNA profiles using GlobalFiler STR chemistry. Hairs without root material could be analyzed with mitochondrial DNA testing (mtDNA).[18]

In prior proceedings, state and defense experts examined some of the hairs collected from the victims and the crime scene, but not nearly all of them. In 2004, the Ninth Circuit-ordered testing of hairs to determine whether any were from a person other than the victims. Both sides agree that none came from Mr. Cooper (and that no hair from an African American was found at the crime scene). Despite the Ninth Circuit order, the district court unduly limited DNA testing of the hairs. The district court did not permit any examination of the numerous hairs that had not been examined for root material, and limited the actual testing to hairs that had already been determined not to have root material (thereby predetermining negative results).

The remaining hairs found on the victims should be examined for root material, and hairs with the root intact should be analyzed using GlobalFiler STR testing. The presence of hairs attached to the victims that did not come from Mr. Cooper or the victims would be compelling evidence of the presence of other assailants during the crimes. DNA profiles obtained from such hairs could be compared with Furrow's DNA profile, which if matched would conclusively prove his involvement in the crimes.[19] Failing a match to Furrow, the DNA profiles from the hairs could be run through law enforcement and private DNA databases for potential

[18] Mitochondrial DNA analysis traces a person's matrilineal ancestry using the DNA in his or her mitochondria.

[19] That outcome would also conclusively prove Mr. Cooper's innocence. No one has ever contended that Mr. Cooper acted with others, in particular with Furrow.

matches, as well as compared to DNA profiles obtained from the tan t-shirt, the orange towel, and the hatchet handle and sheath.

Blood Vial VV-2 (believed to be stored at the San Bernardino County Crime Laboratory)

Mr. Cooper proposes to test blood drawn directly from vial VV-2, which contains blood taken from Mr. Cooper immediately after his arrest. The blood would be analyzed using GlobalFiler STR chemistry.

DNA analysis of blood drawn from Mr. Cooper and placed in vial VV-2 in 1983 should generate only one DNA profile: Mr. Cooper's. In 2004, however, testing identified Mr. Cooper's DNA and DNA from another, unknown person when a swatch prepared with blood from vial VV-2 was examined. Two DNA sources in vial VV-2 is a red flag that tampering has occurred. As Judge Fletcher wrote in 2009, the likely reason for two sources of DNA in the blood sample from VV-2 is that someone with access to the evidence used blood from the vial to plant Mr. Cooper's DNA on the evidence (i.e., the tan t-shirt and blood drop A-41), and then "topped off" the vial to its prior level with another person's blood. (Petition, Ex. 1 [*Cooper v. Brown*, 565 F.3d 581, 596, 599 (9th Cir. 2009).)

Mr. Cooper proposes to retest blood drawn directly from vial VV-2 to determine the status of that blood. Confirming the presence of a second DNA profile in the blood in vial VV-2 would be compelling evidence that other blood evidence against Mr. Cooper was planted. It is also possible that the second DNA source in vial VV-2 would match the unknown DNA contributor(s) found in prior testing of the tan t-shirt and blood drop A-41, which would conclusively prove evidence tampering.

Blood Drop A-41 (believed to be stored at the San Bernardino County Crime Laboratory or the California Department of Justice Crime Laboratory, Richmond, CA)

Mr. Cooper proposes to inspect and test blood drop A-41, if it still exists, to see whose DNA profile it reveals. Blood drop A-41 was a single blood drop collected at the crime scene in June 1983 used by the prosecution to attempt to tie Mr. Cooper to the crimes. A-41, should it still exist, would be analyzed using GlobalFiler STR chemistry.

Blood drop A-41 has had a long and controversial history, including alleged exhaustion from prior testing and subsequent reappearance, among other things. Briefly stated, the prosecution claimed that A-41 was totally consumed by 1983 testing, but a small amount of blood reappeared on A-41 in 1984 for testing that was inconclusive. The integrity of the collection and testing of blood drop A-41 is also highly questionable. (See, e.g., Petition, pp. 98-101 & Ex. 1 [*Cooper*, 565 F.3d at 591].) There are strong indicators that the SBSD criminalist planted blood from vial VV-2 on blood drop A-41, that he did not properly preserve the evidence, and that he tested the drop repeatedly before trial until it was consumed. (See Petition, pp. 98-101 & App. C, p. 203.) Incredibly, the State claimed that A-41 reappeared for testing in 2002 and that such testing purportedly identified Mr. Cooper's DNA. That testing, however, also identified a minor DNA

contributor that did not appear to match any of the victims' DNA, and that could not be identified using the DNA technology then available.

As noted, GlobalFiler STR analysis is many times more sensitive than DNA testing from 2002. In particular, GlobalFiler STR identifies more genetic markers that better discriminate among DNA sources and provides a far more informative and reliable mixture deconvolution than was previously possible. GlobalFiler STR chemistry can also generate reliable results from a much smaller DNA sample, which is especially valuable here given the potentially minute amount of A-41 that still remains.

Identifying the secondary DNA profile discovered in 2002 would be very significant and could call into question the basic integrity of A-41. A match between the secondary DNA profile in A-41 and the secondary DNA contributor in blood vial VV-2 and/or the blood spot from the tan t-shirt would be conclusive evidence of tampering.

Fingernail Scrapings (believed to be stored at the San Bernardino County Crime Laboratory)

Mr. Cooper proposes to test the fingernail scrapings collected from the victims. The scrapings would be analyzed with GlobalFiler STR chemistry, with the scraping from the female victims utilizing Y-STR chemistry to identify the presence of any male DNA.

Fingernail scrapings from the deceased victims were taken during autopsy. The victims each had defensive wounds suggesting they may have scratched or otherwise contacted the attacker, causing DNA to be deposited under their fingernails. These scrapings have not been previously tested. Mr. Cooper proposes to test each victims' scrapings with the advanced GlobalFiler STR chemistry. With respect to the scrapings taken from Peggy and Jessica Ryen, Y-STR chemistry could be used to effectively discriminate between DNA naturally present and DNA left by a male assailant.

A DNA profile obtained in this manner could be compared to Furrow's DNA profile, DNA profiles in law enforcement and private DNA databases, and DNA profiles obtained from other evidence connected to these crimes, such as the tan t-shirt, orange towel, and hatchet handle and sheath. A match through any of these comparison avenues, or among multiple items of evidence known to be related to the crimes, would be strong evidence that Mr. Cooper was not involved in these crimes.

The Green Button (believed to be stored at the San Diego County Courthouse)

Mr. Cooper proposes to test the green button "found" in the hideout house on June 7, 1983. DNA recovery would be done by swabbing the surface of the button. Recovered DNA would then be analyzed using GlobalFiler STR chemistry. Y-STR chemistry could also be used to specifically target male DNA.

Employees of the owners of the hideout house found the green button in the empty bedroom in the hideout house at the same time they found the hatchet sheath, a day after the house had been searched and no button or sheath were found. The prosecution contended the button came from a prison-issue jacket. As noted in the clemency petition, the uncontroverted evidence at trial was that Mr. Cooper was wearing a brown jacket when he walked away from the prison, not a green jacket.

The button contained a small spot of blood, which was typed prior to trial as ABO Type A, consistent with Mr. Cooper and Doug Ryen, as well with as a large percentage of the general population. DNA testing of the blood spot in 2002 was inconclusive.

The surface of the button, including but not only the area of the blood spot, likely still contains DNA. If even a minute amount of DNA remains, analysis using GlobalFiler STR chemistry is likely to be successful. Testing the button could therefore determine whether Mr. Cooper's or Doug Ryen's DNA are on it, as well as whether there is DNA of the person who may have planted the button at the hideout house, as Mr. Cooper contends.

2) Please rank in order of importance every piece of evidence you want tested in this case (starting with the evidence that you think is the most important).

2) In order of importance, Mr. Cooper requests that the following pieces of evidence be tested (in the manner and for the reasons described in response No. 1, above):

(a) Tan T-Shirt
(b) Orange towel
(c) Hatchet handle
(d) Hatchet sheath
(e) Untested hairs from victims' hands
(f) Blood vial VV-2
(g) Blood drop A-41
(h) Fingernail scrapings
(i) Green button

3) If re-testing were to occur in this case, how should it be transported and maintained such that any potential chain-of-custody, tampering, and contamination concerns are addressed?

3) The evidence Mr. Cooper seeks to test has been in the custody and control of the State at all times, and it remains in the State's custody today. Mr. Cooper is not entirely certain of the location of each item of evidence, but believes the items are stored at the following locations: (1) the San Bernardino County

Sheriff's Office evidence room and/or crime laboratory; (2) the San Diego County Superior Court evidence room; and (3) the California Department of Justice Crime Laboratory in Richmond, California.

Each item of evidence will need to be gathered and sent to Mr. Cooper's designated forensic laboratory, Sorenson Forensics, in Salt Lake City, Utah. Mr. Cooper proposes to have a retained forensic expert (not from Sorenson Forensics) present when each item is removed from storage, sealed into an appropriate package for transport, and sent to Sorenson Forensics. The State can have its own representative present for that process, if it chooses. A documented chain of custody for each item will be maintained at the departure point and when received at Sorenson Forensics. As to past chain of custody, the State should provide one for each piece of evidence up to the date it is delivered to Sorenson Forensics.

Sorenson Forensics routinely receives evidence submitted to its laboratory from all over the country. Under their standard protocols, the evidence must be packaged in a sealed condition into a shipping container that also must be securely closed. A trackable carrier, such as UPS or FedEx, should be utilized with overnight delivery services. The chain of custody at Sorenson Forensics begins immediately upon receipt, with reference to the tracking number. Sorenson Forensics will barcode the items of evidence and log them into its Laboratory Information Management System (LIMS) for automated tracking of the chain of custody throughout the testing process. During this step, the outer packaging of the evidence is examined to verify that it has arrived in a sealed condition. All evidence is stored in secured areas with limited access to laboratory staff only. Evidence storage doors have electronic key access that tracks all entry into these secure areas. Sorenson Forensics will maintain the appropriate chain of custody documentation throughout the testing process.

Sorenson Forensics follows specific accreditation requirements to protect evidence from contamination, such as wearing personal protective equipment (gloves, face masks, lab coats), handling one item of evidence at a time, processing evidence and reference samples at a separate time and/or place, running numerous controls throughout the testing process to ensure the integrity of the consumables used and that procedures were followed. Sorenson Forensics is agreeable to having Mr. Cooper's and the State's qualified DNA representatives present to observe the testing and to ensure that the appropriate protocols and standard operating procedures are followed. As discussed in response to Question No. 7 below, the testing protocols, procedures, and methodologies for each item of evidence will have been previously established by Mr. Cooper's retained forensic expert, in consultation with Sorenson Forensics, and with the State's involvement but not control.

4) Do you have a forensic laboratory that you would propose to retain for further testing? Describe their qualifications and experience, and in particular their experience with the latest forms of DNA gathering and testing.

4) Mr. Cooper has retained Sorenson Forensics in Salt Lake City, Utah, to perform forensic testing as part of the requested innocence investigation. Sorenson Forensics is a fully accredited private forensic

DNA testing laboratory that has been performing industry-leading forensic testing since 2006. Sorenson Forensics meets all International Organization for Standardization (ISO) requirements for forensic laboratories, and is accredited by the ANSI-ASQ National Accreditation Board (ANAB), the American Society of Crime Laboratory Directors Laboratory Accreditation Board (ASCLD/LAB-International), and the Scientific Working Group on DNA Analysis Methods (SWGDAM). Sorenson Forensics is audited each year to ensure that it is in compliance with all applicable requirements and standards.

Sorenson Forensics has been a leader in bringing and advancing new technologies into the field of forensics, including M-Vac collection, Y-STR testing, and the newest STR chemistries. Sorenson Forensics has conducted forensic DNA testing in over 75,000 criminal investigations for over 1,000 law enforcement, crime lab, or attorney's offices nationwide.

5) You propose that novel methods of DNA testing, including "touch DNA," be utilized. Please be as specific as possible in describing exactly what kind of testing you are referencing. Describe the scientific validity of these proposed forensic methods, including the use of these methods in other criminal cases, any published literature describing or validating these methods, and any opinions expressed by the relevant scientific and forensic community about the proposed methods.

5) Mr. Cooper is not proposing to rely on "novel methods of DNA testing." Rather, he proposes to utilize the most advanced, established collection and analysis methodologies available today, in particular, M-Vac sample recovery and GlobalFiler DNA chemistry analysis. (See Attachment 2 [M-Vac].) The sensitivity of these advancements on proven methodologies has led to what is now commonly called "touch DNA" – which is not a reference to a testing methodology, but rather refers to the minute amount of DNA from which today's technology can generate reliable results, i.e., merely touching an object leaves enough DNA for M-Vac and GlobalFiler STR to generate an accurate DNA profile.

Sorenson Forensics has been processing samples for "touch DNA" for more than twelve years. Its expert DNA analysts evaluate each item of evidence to determine the best collection method in order to target and recover "touch DNA," as well as any other available DNA source that may exist on the item of evidence. Depending on the item of the evidence, the M-Vac collection method or a double swab (wet/dry) technique have proven to be the most effective forms of collection of "touch DNA." After collection, GlobalFiler STR analysis is the industry state-of-the-art standard, which is simply a more advanced and sensitive improvement on the long-established STR methodology.

6) Describe what safeguards you would propose to prevent the exhaustion or destruction of any evidence.

6) This is an area where a Special Master would provide useful guidance. Sorenson Forensics can provide its standard operating procedures to the parties prior to any evidence being shipped to their

laboratory, allowing the parties to review and know ahead of time the testing protocols that will be utilized. Sorenson Forensics has extensive experience in evaluating the evidence to be tested and making judgments regarding preservation and exhaustion issues. When possible, only half of a stained area and/or an area selected for collection will be taken forward for testing.

As discussed in response to Question No. 7 below, Mr. Cooper requests that his defense team be given final decisional authority with respect to the testing methodology and procedures. Mr. Cooper is literally fighting for his life, and accordingly seeks to conduct all reasonable tests on the pertinent items of evidence to ensure that every potential avenue to exonerate him is pursued. Mr. Cooper's defense team will direct Sorenson Forensics to use reasonable and conservative judgment throughout the testing process, but if exhaustion of a sample is the only way to generate a test result that could exonerate him, Mr. Cooper asserts that exhausting the evidence is the reasonable and required choice.

7) If additional testing is ordered, should the parties enter into a DNA testing agreement similar to the agreement reached in 2001? Is there a forensic testing process that the parties can agree would be beyond reproach? Can the parties agree on which portions of the evidence to analyze if testing is to proceed?

7) A DNA testing agreement is not necessary or warranted. Subject to review by the Special Master, for the reasons discussed below, Mr. Cooper's defense team should have final authority to decide by which method each item of evidence is tested, the location(s) on each item that is tested (to the extent location selection is a factor), and how many and what variety of tests are performed on each item. Mr. Cooper's defense team will pay for the testing.

As noted above, Sorenson Forensics can provide its standard operating procedures prior to testing. Sorenson Forensics' approach to testing is based on step-by-step processing of the evidence that facilitates direct party involvement in key decision-making steps. Sorenson Forensics is willing to have a qualified DNA expert for each party observe testing to ensure that the established protocols are followed.

Within the framework established by Sorenson Forensics, Mr. Cooper's defense team will consider the State's input and suggestions, and Mr. Cooper will be transparent throughout the testing process. Having ultimate decisional authority regarding the testing, however, in conjunction with Sorenson Forensics and the Special Master, is critical to ensure that meaningful tests are performed and meaningful results are obtained. In prior testing, the State and/or the courts have controlled access to the evidence and the key testing decisions, and have essentially excluded Mr. Cooper from critical aspects of the process. For instance, in the 2004 EDTA testing of the tan t-shirt ordered by the Ninth Circuit, the district court prohibited Mr. Cooper's defense team from examining the tan t-shirt, from having any input regarding the location on the t-shirt to be tested, or how the EDTA testing would be done. As a result, the 2004 testing did not actually test the specific blood spot that 2002 testing had identified as containing Mr. Cooper's DNA. Thus, the 2004 testing of the t-shirt provided no meaningful information regarding the sole objective of the testing,

namely, to determine whether that blood spot contained high EDTA levels and was therefore likely planted using Mr. Cooper's EDTA-preserved blood from vial VV-2. The results of the hair testing in 2004 were similarly meaningless because the district court prohibited Mr. Cooper's team from being involved and limited the testing to hairs that had already been determined to be useless for the testing objective. (See Petition, pp. 113-15.)

The Governor is rightly focused on ensuring that any testing ordered in this clemency proceeding have a high likelihood of producing reliable and meaningful results. The advanced forensic methodologies discussed above, conducted by Sorenson Forensics, are unquestionably capable of providing results that "are beyond reproach." To ensure that outcome, Mr. Cooper respectfully asserts that his defense team should be given final decisional authority regarding the testing methodologies and procedures, in concert with Sorenson Forensics and the Special Master, with input from but not control by the State.

8) To the extent not addressed above, you argue that "there is a good chance to obtain 'touch' DNA evidence" that will enable you to determine the "as yet unidentified DNA contributors on A-41, the tan t-shirt, and blood vial VV-2." Why would touch DNA make it more likely that the unidentified DNA contributors can be identified? What will it provide that previous testing could not?

8) Mr. Cooper proposes to test anything that remains of blood spot A-41, and blood from vial VV-2, using GlobalFiler STR chemistry to identify the unexpected and troubling secondary DNA contributor that prior testing revealed but could not identify in those items of evidence. GlobalFiler STR can better discriminate among DNA sources and assist in mixture deconvolution because it provides more DNA information and is many times more sensitive than the Profiler Plus analysis used in previous testing. As a result, GlobalFiler STR analysis provides a higher probability of identifying the unknown secondary DNA contributors and a correspondingly higher probability of determining whether there is a DNA match.

The term "touch DNA" relates to the small quantity of DNA that can now be recovered and reliably tested, and to the casual manner in which adequate DNA can be deposited. The items of evidence that may contain "touch DNA" include the orange towel, the green button, the hatchet handle and the hatchet sheath. (See response to Question No. 1.) These items have previously not been tested for DNA. Similarly, Mr. Cooper proposes to test the tan t-shirt for "wearer DNA" (a form of "touch DNA" deposited on the shirt while wearing it) using the state-of-the-art M-Vac DNA collection method, which is far more effective on porous material such as cloth than DNA recovery methods used in the prior testing. All of these items will be tested for "touch DNA" by using the collection method most likely to recover a viable DNA sample and then analyzed with GlobalFiler STR.

9) You have previously asserted that an individual named Lee Furrow was involved in the murders at issue here. Does a DNA sample from Lee Furrow already exist and/or do you (or anyone else) possess material from Mr. Furrow that might yield a DNA sample?

9) Mr. Cooper's defense team has possession of a DNA sample from Lee Furrow. That sample is being properly preserved and documented with an appropriate chain of custody. DNA analysis has not yet been conducted. Mr. Cooper proposes to submit Furrow's DNA sample to Sorenson Forensics after testing of the evidence discussed above is completed. At that point, Sorenson Forensics will analyze the sample using GlobalFiler STR chemistry and compare Furrow's DNA profile to the DNA profiles obtained from the evidence involved in the crimes.

10) You have previously asserted that an individual named Kenneth Koon was involved in the murders at issue here. Does a DNA sample from Kenneth Koon already exist and/or do you (or anyone else) possess material from Mr. Koon that might yield a DNA sample?

10) Mr. Cooper's defense team does not have a DNA sample from Kenneth Koon, and does not currently have specific evidence that Mr. Koon was involved in the Ryen/Hughes murders. Mr. Koon is now deceased. We are not aware of whether Mr. Koon's DNA was obtained and entered into the CODIS or similar law enforcement DNA database, or a genealogy-type DNA database, prior to his death in 2010 in Jasper County, Texas. The Special Master could direct the appropriate state authorities to determine whether Mr. Koon's DNA exists in a law enforcement database. As part of the innocence investigation Mr. Cooper is requesting, the Special Master could also attempt to identify living relatives of Mr. Koon to obtain DNA samples from which Mr. Koon's DNA profile could be determined.

11) Given that the evidence your client seeks to have retested has been handled by multiple parties, including law enforcement and laboratory technicians, and given that much of the handling of these materials occurred before any form of DNA testing even existed (and therefore no protocols for the proper handling of these materials would have been in place), do you think it's possible that any additional testing is likely to uncover multiple DNA contributors of unknown origin?

11) Yes, testing the items discussed above could possibly identify DNA contributors of unknown origin. That possibility, however, should not impact the Governor's decision to order the innocence investigation including testing that Mr. Cooper requests. All the evidence related to these crimes, and all the evidence Mr. Cooper seeks to test, has at all times been in the control and custody of the State. Mr. Cooper should not be prejudiced if handling, testing or improper storage of the evidence by law enforcement and the prosecution has resulted in potential contamination. Certainly, the mere possibility that test results could include unknown DNA contributors that may require additional evaluation is not a sufficient reason to refuse the testing outright, especially when a person's life is at stake.

In addition, much of the testing Mr. Cooper seeks is likely to produce targeted results that will not be impacted by DNA contributors of unknown origin. "Wearer" testing on the tan t-shirt involves recovering DNA samples from the inside portions of the collar and underarm areas, unlikely locations to have been contaminated by other DNA sources. The orange towel was not admitted into evidence as an exhibit at trial, and has never been subjected to testing after initial serology tests were inconclusive. The hatchet handle has been coated by chemicals law enforcement used to look for fingerprints within a few days after the crimes, which coating has likely acted as a protective layer preserving any DNA that was on the handle when the hatchet was found. Nor would fingernail scrapings and hairs with roots collected at the time of the crimes be vulnerable to DNA contamination from handling or testing. The scrapings have never been tested or handled (to Mr. Cooper's knowledge), and the hair samples Mr. Cooper wants to test were not examined in prior testing.

Correspondingly, some of the testing Mr. Cooper is seeking is specifically intended to establish the identity of "DNA contributors of unknown origin" that were revealed in prior testing. In particular, prior tests on blood spot A-41 and vial VV-2 revealed an unknown, minor DNA contributor that should not have been there. The tested blood stain on the tan t-shirt similarly revealed an unknown DNA contributor that was not Mr. Cooper or apparently any of the victims. Thus, the current unexplained existence of unknown DNA contributors on key items of evidence necessitates the requested testing, and the advanced technology Mr. Cooper seeks to apply can likely provide the results.

The objective of the testing Mr. Cooper seeks is to apply the newest DNA recovery and analysis technologies on items that have either not been previously tested or where previous testing did not yield informative results. The possibility that some unknown DNA contributors could be found in the process is not a reason to deny Mr. Cooper the opportunity to demonstrate his innocence.

12) If further DNA testing is ordered and it shows only the presence of additional DNA material of unknown origin (meaning the DNA could have come from anyone who handled the materials or through inadvertent transfers of genetic material), how would such a result aid in the determination of Mr. Cooper's guilt or innocence?

12) Test results that showed the presence of additional DNA material of unknown origin could be run through the available law enforcement and private DNA databases. While a match is not a certainty, a match is clearly possible, as recently shown by the identification and capture of Joseph James DeAngelo, who has been charged as the Golden State Killer. Even without a database match, tests confirming that the same unknown DNA profile was common to blood spot A-41, blood from the tan t-shirt, and/or vial VV-2, would be conclusive evidence of tampering, and thus strong evidence of Mr. Cooper's innocence (i.e., the same unknown DNA profile should not be present in A-41, VV-2, and the tan t-shirt without tampering).

Regardless, as discussed in response to Question No. 11, it is unlikely that the testing Mr. Cooper requests would fail to provide meaningful results. For example, the inside of the collar and underarm areas of the

tan t-shirt are not likely areas for contamination, thus a "wearer" DNA profile obtained from the t-shirt should be reliable and informative. In fact, if the State is correct that Mr. Cooper is guilty of these crimes, then the "wearer" DNA results from the t-shirt should conclusively demonstrate that fact, and the State should be supportive of conducting that test. Test results are likely to be similarly informative on the orange towel, which has not been extensively handled, and the hatchet handle, which has been coated with a protective layer since a few days after the crimes as the result of law enforcement's attempt to identify fingerprints.

Predicting the significance of other scenarios involving unknown DNA material cannot be done with certainty. But what can be said with certainty is that the potential that unknown DNA material could require further evaluation is not a reasonable basis to deny the testing Mr. Cooper requests.

13) Identify every item of forensic evidence that you maintain was planted or tampered with and identify with as much specificity as possible who you contend planted or tampered with the evidence.

i. To the extent not addressed above, please describe in greater detail your allegation regarding the planting or tampering of evidence with respect to cigarette butt evidence related to the Ryen car. Are you claiming that the San Bernardino Sheriffs Department planted or tampered with this evidence in 1983 or in 2002, or both? Are you alleging that others (including but not limited to the California Department of Justice crime lab and/or law enforcement in San Diego) were also involved, and if so, when?

ii. To the extent not addressed above, when are you claiming that Mr. Cooper's blood was planted on the tan t-shirt, and by whom?

iii. To the extent not addressed above, are you asserting that items in the possession of the San Diego Superior Court clerk from 1984 to 2001 were tampered with during that time period and, if so, by whom? More specifically, you appear to contend that law enforcement officials in San Bernardino withdrew Mr. Cooper's blood from the vial marked VV-2 in 1999 and planted the blood on the tan t-shirt. The People claim that the tan t-shirt has been in continuous possession of the San Diego Superior Court since Mr. Cooper's trial. Do you dispute that point, or do you claim that officials in San Diego cooperated with San Bernardino law enforcement (approximately 16 years after the trial) to tamper with evidence and place Mr. Cooper's blood on the tan t-shirt?

13) Mr. Cooper asserts that law enforcement planted or tampered with several pieces of evidence, prior to trial and during post-conviction proceedings. The items of evidence are: (1) the tan t-shirt; (2) the hatchet sheath; (3) the green button; (4) blood drop A-41; (5) the shoe prints; (6) the cigarette butts; and (7) blood

vial VV-2. Mr. Cooper discusses each item below, and responds to sub-parts (i), (ii) and (iii) of Question No. 13 in the body of those responses.

The Tan T-Shirt

As discussed in the clemency petition, Mr. Cooper contends that law enforcement, most likely SBSD criminalist Daniel Gregonis, planted Mr. Cooper's blood on the tan t-shirt. The blood was planted prior to trial with the expectation that the criminalist would be able to test the shirt and develop a serological profile that was consistent with Mr. Cooper's blood type, thereby establishing a physical connection between Mr. Cooper, the t-shirt and the crimes. The SBSD criminalist repeatedly tested the t-shirt, beginning shortly after it was found and continuing in 1984, but never succeeded in generating test results that could connect Mr. Cooper to the t-shirt.

Mr. Cooper does not know why law enforcement failed to obtain blood typing results they could present and defend at trial, but most likely the planted blood mixed with the existing blood on the t-shirt to an extent that then-available serological methodologies could not adequately distinguish and identify Mr. Cooper's blood from the mixture. When the t-shirt was tested in 2002, DNA technology was able to identify Mr. Cooper's DNA from the blood that had been unavailingly planted prior to trial.

Alternatively, it is also likely that law enforcement planted Mr. Cooper's blood on the tan t-shirt (again, or for the first time) sometime after trial and prior to the 2002 DNA testing, notwithstanding that the t-shirt has been stored in the San Diego County courthouse. Throughout this time, SBSD criminalists have had unrestricted access to vial VV-2 containing Mr. Cooper's blood, which has been stored in the SBSD crime lab since it was drawn on July 30, 1983. It is not unreasonable to conclude that law enforcement personnel from different jurisdictions would look the other way or cooperate to allow SBSD to plant Mr. Cooper's blood on the tan t-shirt before DNA tests were performed. Mr. Cooper cannot prove that collusion at this time, but as detailed in Mr. Cooper's clemency petition, such occurrences within law enforcement are unfortunately not uncommon. (See Petition, pp. 131-48.) The fact that the prior testing showed that both the blood from the tan t-shirt and the blood from vial VV-2 contained an unknown minor contributor underscores the possibility that Mr. Cooper's blood from vial VV-2 was planted on the t-shirt sometime before it was submitted for DNA testing, which is among the inexplicable and troubling evidentiary concerns Mr. Cooper seeks to resolve with this testing.

The Hatchet Sheath and the Green Button

Mr. Cooper contends that law enforcement planted the hatchet sheath and the green bloodstained button in the hideout house sometime on June 6 or June 7, 1983. Mr. Cooper does not know conclusively who planted the sheath and button, but most likely it was one or both of the SBSD detectives who were inside and searched the hideout house the day before (June 6) these critical pieces of evidence were "discovered" (June 7). The chronology is as follows.

On Sunday, June 5, the day the murders were discovered, an SBSD deputy attempted to access the vacant hideout house where Mr. Cooper had stayed as part of the deputy's canvass of the area, but was unable to do so because all the doors and windows were locked. He surveyed the windows and did not see anything of note in the house. On June 6, the owner forced open a door and had two SBSD detectives enter and search the house, including the bedroom in which Mr. Cooper hid from June 2 to June 4. The detectives reported that they had not seen any evidence related to the crimes during that June 6 search.

When the hatchet sheath and green button were "found" the next day, June 7, they were lying in the open in plain sight on the floor of the empty bedroom. It is unlikely that trained and experienced detectives would not have noticed a bloodstained button and a hatchet sheath on an otherwise empty floor during their inspection on June 6, especially when the murders they were investigating involved a hatchet. Mr. Cooper's "sleeping nest" was in the closet in that same bedroom, which the detectives also claimed not to have noticed, despite the presence of several blankets, a pillow, a box of prison-issue loose tobacco, an ashtray, matches, and a belt. Attempting to later explain why he did not notice all this critical evidence, one of the detectives testified that he never entered that bedroom at all. (See Petition, p. 60 [and record citations therein].) However, that detective's fingerprints were subsequently found on the inside wall of that closet, proving that he had not only been in the bedroom but had been in the very closet where Mr. Cooper had hidden, smoked and slept. These circumstances lead to the logical conclusion that one or both of the two SBSD detectives did in fact see Mr. Cooper's sleeping nest and everything else in that closet on June 6, and realized that the prisoner known to have escaped from Chino prison was who had been there.[20] Evidence at trial was that the front door of the hideout house was left unlocked after the June 6 search.

The next day, June 7, two employees of the owners of the hideout house walked into that same bedroom and immediately saw the hatchet sheath and bloodstained button, as well as Mr. Cooper's sleeping nest in the closet. They quickly called SBSD. When SBSD officers arrived, they too now had no trouble seeing the sheath and button on the floor in the empty bedroom, and the numerous items in the closet. From that point, a full team of SBSD investigators and criminalists descended on the hideout house, and on June 9, the SBSD publicly announced that Mr. Cooper was the official suspect.

Evidence developed in post-conviction proceedings further calls into doubt the "discovery" of the sheath and button. In 2015, an SBSD deputy told a defense consultant that he was instructed to obtain a prison jacket from the Chino prison shortly after the discovery of the murders, which may have occurred before

[20] The arrest warrant for Mr. Cooper was supported by the statement that the SBSD had found evidence of inmate smoking habits in the hideout house, meaning that the officers recognized that the box of loose tobacco, the matches and the plastic-cap ashtray found in the closet were the same type of smoking set-up used by inmates at Chino prison. Further, Mr. Cooper re-braided his afro while staying at the hideout house and made no effort to conceal any lost hair. Thus, there is every reason to believe that as of June 6 the SBSD had identified Mr. Cooper as the occupant of the hideout house. (See Petition, pp. 60-61.)

the green button was found. The evidence at trial was undisputed that the jacket Mr. Cooper was wearing when he escaped was brown, not green.

These inexplicable circumstances led Judge Fletcher and four other Ninth Circuit judges to conclude that the green button and hatchet sheath were likely planted in an effort to tie Mr. Cooper's stay at the hideout house to the murders. (Petition, Ex. 1 [*Cooper*, 565 F.3d at 619].)

Blood Spot A-41

Mr. Cooper contends that the serological test results before trial in 1983-84 on blood spot A-41 were falsified, and that his blood was planted on blood spot A-41 by SBSD criminalist Daniel Gregonis prior to the 2002 DNA testing, and quite possibly prior to trial, as detailed below. The handling of blood spot A-41 has been controversial since the crimes occurred and throughout post-conviction DNA testing. In his 2009 dissent, Judge Fletcher concluded: "There is a strong likelihood that the results of the blood tests performed on A-41, presented at trial, were false evidence. There is also a strong likelihood that state actors tampered with A-41 to ensure it would generate inculpatory results when Cooper's post-conviction DNA testing was conducted in 2002." (See Petition, Ex. 1 [*Cooper*, 565 F.3d at 615].)

A-41 was at the center of the prosecution's case and was purportedly the most compelling piece of physical evidence allegedly linking Mr. Cooper to the crime scene. At trial, Gregonis testified that his serological analysis identified A-41 as consistent with Mr. Cooper's exceedingly rare blood type. In 2002 DNA testing, the results purported to identify Mr. Cooper's DNA on A-41. The history and treatment of A-41, however, undermine its reliability and point to tampering.

Before trial, Gregonis waited to test A-41 until he had Mr. Cooper's partial serological profile – "that is, until he knew what he had to match." (Petition, Ex. 1 [*Cooper*, 565 F.3d at 615]). He waited to do the most sensitive testing until he had Mr. Cooper's actual blood in-hand. When his results did not match Mr. Cooper's actual blood type, he altered his lab notes to match Mr. Cooper's blood type. (See Petition, pp. 98-101.) He performed tests on A-41 on the same slide as Mr. Cooper's blood (from vial VV-2), despite acknowledging that blind testing was the appropriate practice. Adding to this unreliability, the State claimed that A-41 was exhausted in 1983, but a small amount of blood mysteriously reappeared for more testing in 1984, but that testing was inconclusive.

Events leading up to the 2002 DNA testing of A-41 are even more troubling. Mr. Cooper began pursuing post-conviction DNA testing in 1999, under a law that was to take effect on January 1, 2001. On August 12, 1999, Gregonis checked A-41 out of the SBSD evidence locker, purportedly to verify its continued existence, and did not return A-41 until the next day, August 13. At the subsequent evidentiary hearing, Gregonis testified that he did not open the glassine envelope containing A-41 when he checked it out in August 1999. Photographic evidence, however, shows Gregonis' initials on the glassine envelope seal, and the date August 13, 1999, showing that Gregonis did, in fact, break the seal and open the glassine

envelope at that time. How the "exhausted" sample continues to be testable remains unexplained. As noted above, Gregonis has had unrestricted access to Mr. Cooper's blood in vial VV-2 in the crime laboratory since 1983.

Given that there was no need to open the glassine envelope in 1999 to verify A-41's existence prior to DNA testing, and Gregonis' untruthful testimony that he did not open it August 12-13, 1999 (as well as the history of A-41's "exhaustion"), Mr. Cooper contends that Gregonis put Mr. Cooper's blood on A-41 when Gregonis checked A-41 out in anticipation of the DNA testing Mr. Cooper was pursuing. The fact that the 2002 testing of A-41 also identified an unknown minor DNA contributor, as did 2004 testing of the swatch of Mr. Cooper's blood from vial VV-2 (see response to Question No. 1), further supports Mr. Cooper's conclusion regarding tampering prior to DNA testing of A-41.

The Shoe Prints

Mr. Cooper asserts that law enforcement planted PRO-Keds Dude shoe prints on the spa cover at the Ryen house, on the bedsheet from Mr. and Mrs. Ryen's bed, and in the hideout house where Mr. Cooper stayed. Mr. Cooper cannot identify with certainty the SBSD personnel who planted each shoe print, but believes an SBSD deputy/detective on the investigation team most likely planted the prints on the spa cover and in the hideout house, and that an SBSD criminalist planted the shoe print on the bedsheet when it was in the crime lab several weeks after the crimes. The shoe print evidence was critical at trial because the prosecution falsely told the jury that this type of shoe was not available at retail and was sold only to institutions, such as the Chino men's prison. (See Petition, pp. 70-72, 93-98).

The PRO-Keds Dude shoe print on the spa cover was found under questionable circumstances that suggest it was planted. On the morning of June 8, three days after the murders, an SBSD deputy was told to sketch all of the shoe prints on the spa cover. When none of her sketches matched the print of a PRO-Keds Dude shoe, she was directed back to the spa cover to take another look. Only then did she see a print that purportedly matched the PRO-Keds Dude tread. Inexplicably, the photograph an SBSD deputy took of the spa cover on June 5 was not presented at trial to demonstrate the existence of the shoe print that allegedly tied Mr. Cooper to the murders. Additionally, the same SBSD deputy who was directed to obtain the prison jacket shortly after the crimes (see above, discussion of the green button), also told Mr. Cooper's defense team that he was instructed to retrieve tennis shoes from the prison. (See Petition, Ex. 90.)

The shoe print found at the hideout house was discovered in similarly suspicious circumstances. As discussed above, events related to the SBSD's search of the hideout house suggest that by June 6 they had identified Mr. Cooper as the person who had been there, and had obtained shoe samples from the Chino prison shorty after discovering the murders. Testimony at trial showed that the front door of the hideout house was left unlocked after the detectives searched it on June 6, and at least twelve law enforcement officers walked through the house before the shoe print was discovered. (Petition, pp. 71-72.)

The bloody shoe print found on the bedsheet from the Ryen's bedroom was not discovered until early July 1983, roughly a month after the crimes. The SBSD criminalist who discovered it, William Baird, claimed that he saw the bloody footprint when he refolded the sheet in the crime lab. However, SBSD had obtained samples of PRO-Keds Dude shoes from the Chino prison, and Baird [21] admitted that he had practiced with these shoes and blood to try to recreate the print on the bedsheet. Mr. Cooper contends, and the circumstances support his conclusion, that Baird planted the shoe print on the bloody sheet and then testified about "recreating" the print to explain why he had been making bloody shoe prints in the lab.

The Cigarette Butts

Mr. Cooper asserts that law enforcement planted the cigarette butts identified as V-12 and V-17 in the Ryen station wagon on June 11, 1983. One or both of the SBSD criminalists who performed the inventory of the contents of the station wagon likely planted these cigarette butts.

The Ryen's station wagon was taken the night of the crimes and found a week later, at 7:30 a.m. on June 11, in a church parking lot in Long Beach. The citizen who reported the car to the police, and who frequently walked his dog on that route, said he did not see the car there the previous evening. An SBSD detective performed a search of the car in the parking lot, and inventoried numerous items that were in the car, including a piece of black electric tape, a magazine, a Burger King cup and food wrappers, a flyer, and cigarette butts in the ashtray, among several other items. A second search by two SBSD criminalists generated a second inventory of items from the station wagon. This inventory was undated and unsigned, and included two cigarette butts that were not in the initial inventory of the car contents (and did not contain the cigarette butts the first inventory had noted in the car's ashtray). According to the second search and inventory, cigarette butt V-12 was found in the front passenger seat crevice, and cigarette butt V-17 was found on the passenger side floor.

The SBSD criminalists who conducted the second inventory and found cigarette butts V-12 and V-17 were the same criminalists who processed the hideout house on June 7 and 8. Mr. Cooper had smoked numerous manufactured and hand-rolled cigarettes in the hideout house, but the criminalist logged into evidence only one cigarette butt from the hideout house. The criminalists made no record of what happened to the other cigarette butts Mr. Cooper left in the hideout house and they collected.

Given the importance SBSD placed on cigarette butt evidence at trial, there is no reasonable explanation why the multiple cigarette butts Mr. Cooper smoked and left in the hideout house, and SBSD recovered, were not logged into evidence. Nor is there an explanation as to why the two cigarette butts that purportedly linked Mr. Cooper to the Ryen's car, V-12 and V-17, were not listed in the first inventory of the car but

[21] This is the same criminalist who was subsequently caught stealing heroin from the SBSD evidence locker for both his personal use and sale.

thereafter showed up in the second inventory, which was conducted by the same criminalists who processed the hideout house and failed to account for the cigarette butts Mr. Cooper left there.

Subsequent events related to these cigarette butts are also troubling. In 2001, even though the prosecution had claimed that cigarette paper from one of these butts (V-12) had been consumed in testing in 1984, the paper somehow "reappeared" in time for the 2002 DNA testing. The "reappeared" paper had inexplicably changed color and grown in size from 4 millimeters to 7 millimeters. (See Petition, Ex. 1 [*Cooper*, 565 F.3d at 618]; Ex. 2 [*Cooper v. Brown*, 510 F.3d 870 (2007) (McKeown concurring)]; Ex. 21 [Letter of Janine Arvizu, Certified Quality Auditor dated Oct. 8, 2013].) That Mr. Cooper's DNA was found on whatever cigarette butt was tested in 2002 is not surprising, given the multiple cigarette butts that were never logged into evidence from the hideout house.

As these events and circumstances show, the logical explanation is that two of the cigarette butts from the hideout house that the criminalists did not log into evidence were planted in the Ryen station wagon by those same criminalists in order to cement the connection between Mr. Cooper and the crimes.

Blood Vial VV-2

Mr. Cooper asserts that one or more SBSD criminalists have tampered with blood vial VV-2 by refilling the vial with another person's blood to make up for the blood that was used for planting.

Following Mr. Cooper's arrest on July 30, 1983, law enforcement took a blood sample from him that was marked as item VV-2. A swatch of Mr. Cooper's blood taken from VV-2 was prepared for DNA testing in 2002 in order to generate Mr. Cooper's DNA profile. In 2004, testing of that swatch identified Mr. Cooper's DNA, but also identified an unknown secondary DNA contributor. Blood vial VV-2 should contain only Mr. Cooper's blood, thus the presence of a secondary DNA contributor raises very troubling questions. As Judge Fletcher surmised, and Mr. Cooper contends, the reason two sources of DNA were found in the blood from VV-2 is because someone had used blood from the vial to plant Mr. Cooper's DNA on other evidence and then refilled the vial to cover up that fact.

14) You highlight in your client's clemency petition the fact that the police issued an all-points-bulletin for three white or Hispanic suspects. At or about the same time, you appear to also argue that the police were planting evidence to frame Mr. Cooper. If this is your contention, how do you explain this apparently inconsistent behavior by the police?

14) The planted items of evidence that are relevant to this question are the hatchet sheath and the green prison jacket button, both of which were "found" in the hideout house on June 7, 1983, the same day SBSD issued the referenced bulletin. Clearly, the bulletin had been prepared the day before.

The actions by law enforcement to plant evidence against Mr. Cooper did not need to involve or be communicated to the entire sheriff's department to be effective. The evidence planting and tampering discussed above (response to Question No. 13) could be and were accomplished by a limited number of people who did not need to or necessarily want to involve a broader group within the department. That is particularly true with respect to the hatchet sheath and green button, which could have been planted by one person acting alone by entering the unlocked hideout house sometime on June 6 or June 7.

The San Bernardino County Sherriff's department was a large organization in 1983, as it still is. One part of any large organization does not always know what another part of that organization is doing. Within law enforcement, for instance, administrative personnel are not likely to know what homicide detectives may be doing in any particular investigation at any particular time. From within a few hours of discovery of the crimes on June 5, the investigation of these crimes involved dozens of SBSD detectives, patrol officers, criminalists, ranking department management, and others. Thus, the specific SBSD personnel who were responsible for preparing and issuing public notices, such as the one that appeared on June 7, 1983, would not have been told or aware of the events and developments occurring in real time in the investigation. In particular, they would not have known that investigators had at that time zeroed in on Mr. Cooper and were taking action to ensure the evidence against him was compelling. On the contrary, as of June 7, when the bulletin was issued, the only "suspect" information known to the broader SBSD and the public was based on Josh Ryen's identification of three white or Hispanic assailants. Thus, it is not surprising or inconsistent that the SBSD issued the bulletin to that effect around the same time evidence against Mr. Cooper was being planted.

15) If you claim that law enforcement planted Mr. Cooper's blood prior to the advent of DNA testing, why in your view would they plant such evidence?

15) As discussed above (response to Question No. 13), Mr. Cooper contends that law enforcement planted his blood on the tan t-shirt prior to trial with the expectation that they would be able to develop a serological profile that was consistent with Mr. Cooper's blood type, and thereby connect Mr. Cooper to the t-shirt and the crimes. They were not successful in getting a match, so they did not introduce the tan t-shirt at trial. Also as described above, Mr. Cooper contends that law enforcement probably planted his blood on A-41 prior to trial and later planted his blood on A-41 in anticipation of the DNA testing Mr. Cooper was pursuing beginning in 1999 (i.e., when Daniel Gregonis checked A-41 out on August 12, 1999). Thus, during post-conviction proceedings, the planting of blood on A-41 was actually motivated by the advent of DNA testing. [22]

[22] Also as discussed above, it is not inconceivable that law enforcement in the San Diego courthouse would turn a blind eye to SBSD's planting of Mr. Cooper's blood on the tan t-shirt prior to the 2002 DNA testing. Frequent revelations of such conduct across the country make that possibility quite conceivable.

The fact that DNA testing did not exist in 1983 and 1984 does not lead to the conclusion that law enforcement had no reason to plant Mr. Cooper's blood prior to trial or that law enforcement did not do so. On the contrary, there were good reasons for law enforcement to plant Mr. Cooper's blood prior to trial. Then-existing serology technology allowed law enforcement to type blood based on several distinguishing markers and characteristics that, in combination, could exclude or include individuals as potential donors of the blood at issue, especially when one possible donor was black and the others were white. In fact, law enforcement's purported identification of blood spot A-41 as being consistent with Mr. Cooper's blood type was emphasized at trial and, in the prosecution's view, conclusively proved Mr. Cooper was in the Ryen house. Thus, law enforcement considered blood typing evidence more than compelling, and would have considered it extremely valuable evidence if they could find blood on the tan t-shirt and/or A-41 prior to trial that was consistent with Mr. Cooper's blood type.

16) Do you acknowledge that the presence of EDTA in any piece of forensic evidence may not be the result of tampering but may instead be the result of lab contamination, or the result of a lab intentionally using EDTA to preserve a blood sample? If so, if subsequent testing were to reveal the presence of EDTA in any piece of forensic evidence, what significance should be ascribed to that fact?

16) EDTA can be present in evidentiary material for innocuous reasons. However, it is not a chemical used as part of laboratory procedures and thus its presence as a contaminant in a laboratory, particularly one that is being asked to test for it, simply defies credibility. Thus, Dr. Suizdak's assertion that there was EDTA "contamination" in his laboratory is completely untenable. Judge Huff's refusal to permit Mr. Cooper to discover the basis for the claim of EDTA "contamination" was gross error, as Judge Fletcher found. A Special Master would be able to help Mr. Cooper obtain Dr. Suizdak's laboratory notes and other documentation that can reveal the true reason why Dr. Suizdak's results were withdrawn. A Special Master would also allow questioning of Dr. Suizdak to find out his explanation.

EDTA is present at extremely low levels in many places in the environment. But when it is at high levels in blood, it must be assumed to come from its use to preserve blood. As described in his clemency petition, Mr. Cooper contends that his blood was planted on the tan t-shirt and blood spot A-41, and that properly structured EDTA testing of that evidence would have shown heightened levels of EDTA that cannot be explained except by tampering. The Ninth Circuit ordered Judge Huff to allow Mr. Cooper to conduct EDTA testing on A-41 and the t-shirt, but Judge Huff thwarted Mr. Cooper's attempts, as described in the clemency petition, as well as by Judge Fletcher. (*See* Petition, pp. 113-17; Ex. 1 [*Cooper*, 565 F.3d at 583, 595-97].)

Mr. Cooper addresses EDTA testing in his clemency petition, submitted in February 2016. As seen above (response to Question Nos. 1 & 2), Mr. Cooper is not prioritizing EDTA testing at this time for A-41 because A-41 has already been "exhausted" more than once. Mr. Cooper does not know how much of blood spot A-41 remains that can be tested, even with today's advanced DNA technology, thus he has limited the testing he is requesting related to A-41. Mr. Cooper believes that his tampering claims can be proven by

identifying the unknown minor DNA contributor previously revealed but not identified in blood spot A-41, the tan t-shirt and vial VV-2. Mr. Cooper expects GlobalFiler STR analysis to successfully identify the DNA profile of that minor contributor, and that it will be the same contributor in each item of evidence. That confirmation will conclusively prove that Mr. Cooper's DNA found on A-41 and the tan t-shirt was put there by law enforcement.

Mr. Cooper has limited and prioritized the testing he is seeking as discussed and listed above. (See responses to Question No. 1 and 2.) He expects the results of that testing to fully exonerate him. Should any uncertainty as to Mr. Cooper's innocence claims and tampering assertions remain, EDTA testing can be performed at that time.

17) Previous court orders have stated that Mr. Cooper escaped from a mental hospital in Pennsylvania in 1982 while awaiting trial on a number of charges and that while on the run, he kidnapped, raped, and then stole the car of a teenage girl who had interrupted him while he was burglarizing a home. Should this prior arrest have any bearing on your client's clemency application? Why or why not?

17) The described prior *allegations* against Mr. Cooper should not bear on Mr. Cooper's clemency application, or in particular, his current request for an innocence investigation and the forensic testing discussed in these responses. Mr. Cooper was not charged for the alleged kidnapping, rape and related actions in Pennsylvania. As a strategy decision during trial, Mr. Cooper stipulated in the penalty phase to the occurrence of those events, but he did not plead guilty to and has not been convicted of those crimes. The fundamental tenet of our justice system is that a person is not deemed guilty of a crime and is not punished for a crime unless and until that person has been tried and convicted consistent with due process. Holding untried allegations against Mr. Cooper in this clemency proceeding would be contrary to those fundamental principles.

Beginning from his arrest on July 30, 1983, Mr. Cooper has served more than 35 years in jail and prison, the last 33 years on death row. Mr. Cooper has served (and continues to serve) a longer sentence than in all probability he would have received had he pled guilty to or been convicted of these crimes in 1982.

Mr. Cooper's request for an innocence investigation and forensic testing should be evaluated based on the numerous facts and circumstances, from the time of trial and that have been discovered post-conviction, that raise serious doubts and troubling concerns regarding the evidence of Mr. Cooper's guilt of the crimes for which he was sentenced to death. In turn, Mr. Cooper's clemency application should be determined based on the results of the innocence investigation and forensic testing he is seeking.

18) Records show that, at the time of his arrest for the murders at issue here, Mr. Cooper was also arrested for raping a woman on a boat near the time of his capture. Should the circumstances leading to his arrest for forced oral copulation, rape by threat, sexual penetration by a foreign object with force, and sodomy, or the fact that the Santa Barbara District Attorney's Office apparently did not pursue these charges in light of the murder convictions, have any bearing on your client's clemency application? Why or why not?

18) Mr. Cooper's arrest for the described actions, and the prosecutor's decision not to try Mr. Cooper on those allegations, should not bear on Mr. Cooper's clemency petition or his current request for an innocence investigation and forensic testing. As with the events discussed in response to Question No. 17, Mr. Cooper was not tried and convicted of these crimes, and he did not plead guilty to them. Mr. Cooper has continuously maintained that the sexual interaction with the woman on the boat was consensual, and that allegations of criminal conduct only arose because the woman's husband discovered and interrupted their consensual actions. As stated above, fundamental principles of due process require that Mr. Cooper not be punished or prejudiced based on untried allegations. Mr. Cooper's request for an innocence investigation and forensic testing should be evaluated in light of the serious doubts and troubling issues regarding his guilt in the Ryen/Hughes crimes, and his clemency application should be determined, in turn, based on the results of that innocence investigation and forensic testing.

19) You claim to have recently discovered new evidence related to the case. Please describe this recently discovered evidence and detail whether it could form the basis of a federal or state habeas corpus petition.

19) As noted above, Mr. Cooper's defense team has obtained a DNA sample from Furrow. That sample can be submitted to Sorenson Forensics at the appropriate time for GlobalFiler STR analysis to identify Furrow's DNA profile.

Mr. Cooper's defense team also has obtained sworn declarations from three people who describe statements and/or circumstances supporting Mr. Cooper's assertion that Furrow was involved in these crimes. As noted above, no one has ever contended that Mr. Cooper and Furrow committed these crimes together, thus evidence of Furrow's guilt is necessarily evidence of Mr. Cooper's innocence.

Mr. Cooper cannot divulge the names of the declarants or provide copies of the declarations at this time due to considerations for their personal safety. In brief, one declarant describes statements Furrow made to the declarant confessing to the crimes, and the identity of the two other people who participated in the crimes with Furrow, all as told by Furrow to the declarant. The other two declarants relate their personal knowledge of facts and events involving Furrow and the assailants who committed the crimes with Furrow.

The question of whether newly discovered evidence gives Mr. Cooper a basis for filing a new habeas corpus petition ignores that Mr. Cooper has already spent over thirty-three years on death row for crimes he has

always maintained he did not commit, and that he filed this clemency petition with the Governor seeking an innocence investigation over two and a half years ago. It also ignores that, with the passage of Proposition 66, many forces in favor of the death penalty are trying to rush the state into executions, and Mr. Cooper is at the top of their target list. Indeed, San Bernardino County District Attorney Michael Ramos recently filed a motion to intervene in the *Morales* lethal injection litigation in federal court for the express purpose of speeding up Mr. Cooper's execution. While Mr. Ramos' motion was denied, just this week he appealed that ruling. These actions show that Mr. Cooper is a target for imminent execution and that his innocence needs to be demonstrated now. The best means for that is the innocence investigation that Mr. Cooper has requested through his clemency petition.

The question of whether Mr. Cooper should file a new habeas corpus petition also ignores both the time such habeas proceedings take (often many years), the likelihood that Mr. Cooper would face an execution date before a final decision on such a petition is handed down (necessitating another clemency petition seeking a reprieve anyway), and the extreme difficulty such habeas petitions face in succeeding because of restrictions on both state and federal courts' liberty to explore factual innocence claims. As the IACHR found, Mr. Cooper's prior habeas proceedings under the AEDPA has been ineffective to provide a full and fair hearing. Moreover, such habeas petitions take years to be processed, and discovery pertinent to innocence is often limited, which is one of the reasons other states have adopted innocence commissions. A new habeas petition is not a practical or justified option at this point.

Conclusion

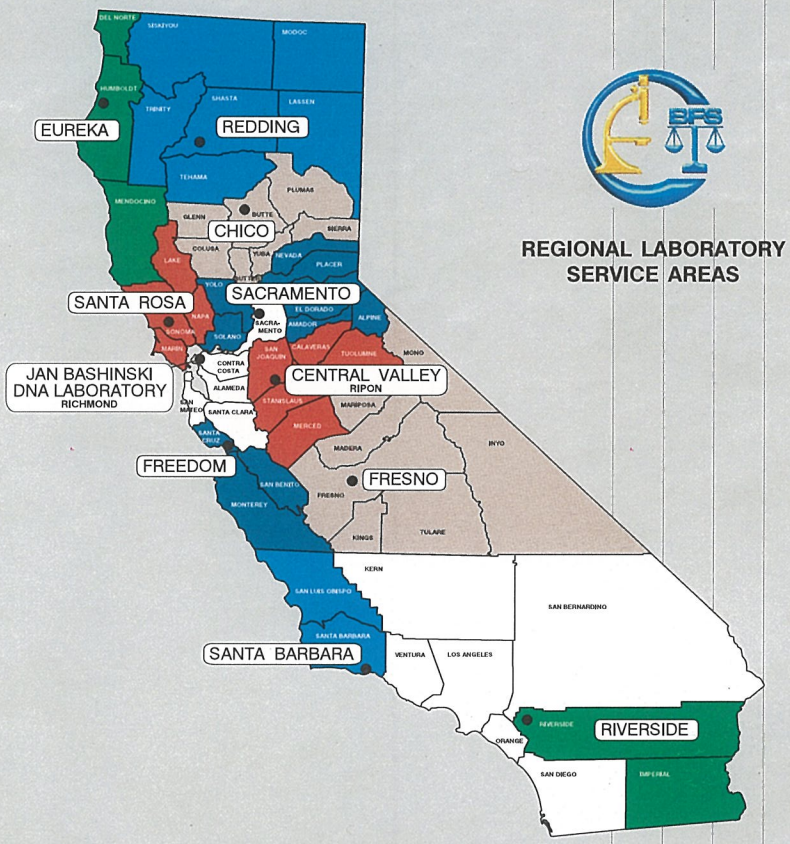
As stated at the outset, Mr. Cooper thanks you, Governor Brown and his staff for the detailed review and consideration of his clemency petition. The clemency petition and related submissions, and the above responses to your July 3 letter, provide a compelling case for granting Mr. Cooper's request for an innocence investigation with advanced forensic testing. Legitimate and substantial uncertainties about Mr. Cooper's guilt remain; these uncertainties were not conclusively resolved by the 2002 testing, which results must be viewed as unreliable under today's advanced standards and in light of the questions regarding the integrity of the evidence. Mr. Cooper respectfully requests that Governor Brown appoint a Special Master to work with the BPH to conduct an innocence investigation including forensic testing in order to allow Mr. Cooper a full and fair opportunity to prove his innocence.

Very truly yours,

Norman C. Hile

Norman C. Hile

EXHIBIT 1



REGIONAL LABORATORY SERVICE AREAS

The Bureau of Forensic Services (BFS) regional laboratory system was established in 1972 to provide assistance to local law enforcement agencies that did not have access to local crime laboratory services. Today, BFS is a comprehensive, state-of-the-art system accredited by the American Society of Crime Laboratory Directors, Laboratory Accreditation Board – International (ASCLD/LAB). The BFS system serves 46 of the state's 58 counties. BFS operates 10 regional crime laboratories for which forensic scientists collect, analyze, interpret, and compare physical evidence from suspected crimes. In addition, the Jan Bashinski Laboratory in Richmond houses the DNA Databank, Missing Persons DNA Program, method validation, and a DNA casework section. DNA casework analysis also is currently performed at six BFS laboratories: Central Valley in Ripon, Fresno, Redding, Riverside, Sacramento and Santa Barbara.

BUREAU OF FORENSIC SERVICES

Headquarters	(916) 210-7460

REGIONAL LABORATORIES

Chico	(530) 895-5024
Eureka	(707) 445-6682
Freedom (Watsonville)	(831) 761-7620
Fresno	(559) 294-4000
Redding	(530) 224-7800
Central Valley (Ripon)	(209) 599-1400
Riverside	(951) 361-5000
Sacramento	(916) 227-3777
Santa Barbara	(805) 679-4000
Santa Rosa	(707) 570-4000

SPECIAL FORENSIC PROGRAMS

California Criminalistics Institute (Training)	(916) 464-0600
Digital Evidence	(916) 227-3623
Jan Bashinski DNA Laboratory	(510) 620-3300
CAL-DNA Data Bank	(510) 620-3300
DUI/EPAS/ISU (FAIRIT)	(916) 227-5605
Latent Prints	(916) 227-3797
Missing Persons DNA Program	(510) 620-3300
Quality Assurance Unit	(916) 210-7443
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CALIFORNIA DEPARTMENT OF JUSTICE
DIVISION OF LAW ENFORCEMENT
BUREAU OF FORENSIC SERVICES
BARRY MILLER, BUREAU DIRECTOR

Rev. 5 10/2017

CALIFORNIA DEPARTMENT OF JUSTICE

BUREAU of FORENSIC SERVICES

Accredited by the American Society of Crime Laboratory Directors Laboratory Accreditation Board (ASCLD/LAB-International)

DIVISION OF LAW ENFORCEMENT

OVERVIEW

The Bureau of Forensic Services (BFS) is the scientific arm of the Division of Law Enforcement that serves the people of California on behalf of the Attorney General's Office. Forensic scientists collect, analyze, and compare physical evidence from suspected crimes. They provide analysis of evidence in toxicology, including alcohol, controlled substances and clandestine drug labs, biology and DNA, firearms, impression evidence such as shoeprints, tire marks or fingerprints, trace evidence including hair, fibers, and paint, and crime-scene analysis of blood spatter patterns and evidence collection, and they testify in state and federal court cases about their analyses in criminal trials. http://oag.ca.gov/bfs

MISSION

The California Department of Justice Bureau of Forensic Services provides high quality, impartial forensic service in the interest of public safety and justice.

VISION

BFS seeks excellence in forensic science services by:

- Implementing efficient, effective, and high-quality forensic techniques.
- Meeting or exceeding the highest forensic professional standards.
- Delivering to employees the highest level of training.
- Providing state-of-the-art facilities and equipment.

AWARD-WINNING LABORATORY SYSTEM

The BFS Rapid DNA Service (RADS) Team received a U.S. Department of Justice Award for Professional Innovation in Victim Services in April 2014. RADS began as a pilot test in four counties in 2011 to decrease the time needed to analyze DNA collected from victims of suspected sexual assaults to 15 days or less and to increase the number of cases analyzed. The DNA profiles were uploaded into the FBI's Combined DNA Index System (CODIS) for searching against offender DNA profiles or to DNA from other crimes. The rapid analysis at the BFS lab in Richmond, and later at the Santa Barbara lab, helped police agencies to respond to the evidence in less time, thus allowing for improved public safety.

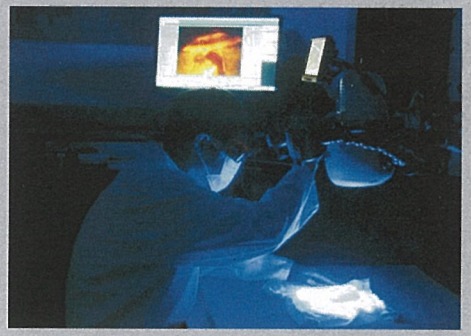
CAREER OPPORTUNITIES IN THE ATTORNEY GENERAL'S OFFICE

Criminalists and Minimum Qualifications

These forensic scientists apply scientific techniques and the scientific method to the examination and analysis of physical evidence, and they testify as experts in courts on their findings. Their education is equivalent to graduation from college with a major in one of the physical or biological sciences, including the equivalent of eight semester hours of general chemistry and three semester hours of quantitative analysis. See our web site for more details and application guidelines. http://oag.ca.gov/careers/exams

INFORMATIONAL FORENSIC WEBSITES:

http://cacnews.org/ http://aafs.org/ http://www.ascld-lab.org/
http://cacld.net/ http://www.ascld.org/



CRIMINALISTICS LABORATORIES

BFS operates a network of laboratories throughout the state in areas not served by a city or county forensic laboratory, providing the services below:

- Alcohol
- Biology
- Controlled Substances
- Digital Evidence
- DNA Casework
- DNA Data Bank
- DNA Missing Persons
- Field Investigations: Clandestine Labs Crime Scenes
- Firearms/Toolmarks
- Gunshot Residue Analysis
- Impressions
- Latent Prints
- Toxicology
- Trace

CONTROLLED SUBSTANCES, CLANDESTINE LABS

All regional laboratories provide analytical support to law enforcement agencies to identify seized drugs. BFS also provides technical support in the examination of illicit drug labs, including the analysis of source chemicals and finished products.

DIGITAL EVIDENCE

In response to the proliferation of the use of technology in all aspects of commerce and communication, BFS has added a Digital Evidence program to examine computers, cell phones and other such devices for forensic evidence of human trafficking, drug trafficking, child pornography and other crimes.

DNA ANALYSIS

Several BFS labs focus on DNA by analyzing biological evidence seized by law enforcement in criminal cases: Central Valley, Fresno, Redding, Riverside, Sacramento, Santa Barbara and the Jan Bashinski DNA Laboratory in Richmond.

The Jan Bashinski Laboratory in Richmond conducts research to advance DNA typing and coordinates the development of statewide standards on forensic DNA analysis. The laboratory has established CAL-DNA, a computerized DNA identification data bank to which evidence analysis results can be compared to identify unknown offenders. This database works in conjunction with the National DNA Index System (NDIS) as part of the Combined DNA Index System (CODIS).
For the latest numbers, go to http://oag.ca.gov/bfs/prop69

LATENT PRINTS

Latent print analysts provide field response by processing major crime scenes and clandestine drug labs. They also process submitted evidence to look for latent (invisible) prints and perform print comparisons.

BLOOD, BREATH, AND URINE ANALYSIS

The Alcohol/Toxicology program analyzes blood, breath, and urine samples taken from drivers suspected of driving under the influence (DUI). Analysts provide testimony on their findings, as well. The program analyzes samples from non-driving cases by special request.

FIELD INVESTIGATION SUPPORT

BFS criminalists and latent print examiners provide local law enforcement agencies with crime-scene investigation support. These services include evidence collection and processing and crime-scene reconstruction.

FORENSIC SCIENCE TRAINING

The California Criminalistics Institute (CCI) is a training facility that offers state-of-the-art training to criminalists in all public laboratories in California. Created by statute in 1986 to advance public safety by offering training in the latest evidence analysis techniques, CCI has offered as many as 89 classes per year in all areas of analysis, including DNA and biology, impression evidence, controlled substances and alcohol and firearms. CCI also trains criminalists in effective courtroom testimony and the ethics of handling evidence and working in a public laboratory. For more information or for course offerings, see: http://oag.ca.gov/cci

EXHIBIT 2

Improving DNA Evidence Collection via Quantitative Analysis: A Systems Approach

Amanda Garrett, David Patlak, Amy Brodeur, and Catherine Grgicak

Boston University School of Medicine
Department of Anatomy & Neurobiology, Biomedical Forensic Sciences
72 E. Concord Street, Boston, MA 02118

Introduction

- In the collection of biological evidence from a crime scene, it is imperative to implement the most effective and robust collection method to ensure maximum DNA recovery.
- While common techniques for biological collection such as swabbing, cutting, scraping, and taping have been a mainstay in forensics, there are drawbacks of these techniques, which include, but are not limited to, the lack of surface area that may be processed, potential co-elution of PCR inhibitors, and non-optimized elution of cells from the substrate into solution.
- Due to this, an advancement, or new technique, in the area of biological evidence collection is needed in order to optimize collection from different items of interest, especially large items.
- Recent work in the field of pathogen testing suggests the use of a wet-vacuum collection system may be a valuable addition/alternative to already well-established biological collection methods (1).
- In this study, traditional biological collection methods, including the double swab method and taping, are compared to a wet-vacuum system (Microbial-Vac Systems® Inc., Bluffdale, UT) through the collection of different volumes of blood (0.075 - 75 µL) on tile, denim, and carpet:

Methods

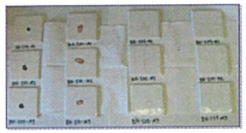


Figure 1. Representative image of different volumes of blood ranging from 0.075 to 75 µL on a non-porous substrate (tile).

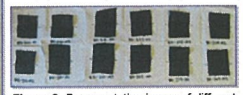


Figure 2. Representative image of different volumes of blood ranging from 0.075 to 75 µL on denim.

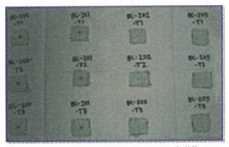


Figure 3. Representative image of different volumes of blood ranging from 0.075 to 75 µL on carpet.

Whole Blood

75 µL of the appropriate blood dilution was spotted on each substrate, allowed to dry, and then collected using the double swab method, taping, or the M-Vac®. Therefore, the representative volume of blood tested was 75 µL, 7.5 µL, 0.75 µL, and 0.075 µL.

1. Extraction performed using QiAmp® Investigator extraction protocol (Qiagen, Valencia, CA).
2. Quantification performed using the QuantifilerDuo® Quantification Kit (ABI, Carlsbad, CA) and the 7500 Detection System.
3. Each sample was analyzed in triplicate.

References

1. Bradley B, Saddler F. Comparisons of Meat Carcass Surface Bacterial Collection Efficiencies Utilizing a Novel Wet-Vacuum Microbial Sampler and the Sponge Method. Proceedings of 54th Annual Reciprocal Meat Conference, 2001 Indianapolis

Results

Table 1. Average concentrations of blood (0.075 – 75 µL) collected from tile using various collection methods (in ng/µL).

	75 µL Blood	7.5 µL Blood	0.75 µL Blood	0.075 µL Blood
Whole Blood	58 (±17)	7 (±9)	0.51 (±0.08)	0.03 (±0.03)
Double Swab	75 (±14)	3 (±3)	0.16 (±0.08)	0.01 (±0.01)
Tape (BVDA Instant Lifters®)	50 (±28)	1 (±1)	0.1 (±0.1)	0.02 (±0.02)
Vacuum Collection (M-Vac®)	66 (±7)	3 (±2)	0.2 (±0.1)	0.02 (±0.02)

(2 Standard Deviations)

Table 2. Average concentrations of blood (0.075 – 75 µL) collected from denim using various collection methods (in ng/µL).

	75 µL Blood	7.5 µL Blood	0.75 µL Blood	0.075 µL Blood
Whole Blood	58 (±17)	7 (±8)	0.51 (±0.08)	0.03 (±0.03)
Double Swab	9 (±1)	0.5 (±0.4)	0.01 (±0.01)	0.001 (±0.004)
Tape (BVDA Instant Lifters®)	3 (±3)	2 (±1)	0.1 (±0.2)	0.004 (±0.004)
Vacuum Collection (M-Vac®)	64 (±3)	4.8 (±0.2)	0.16 (±0.04)	0.02 (±0.04)

(2 Standard Deviations)

Table 3. Average concentrations of blood (0.075 – 75 µL) collected from carpet using various collection methods (in ng/µL).

	75 µL Blood	7.5 µL Blood	0.75 µL Blood	0.075 µL Blood
Whole Blood	58 (±17)	7 (±8)	0.51 (±0.08)	0.03 (±0.03)
Double Swab	27 (±9)	1 (±2)	0.01 (±0.006)	0.001 (±0.003)
Tape (BVDA Instant Lifters®)	9 (±2)	0.3 (±0.2)	0.1 (±0.2)	0.001 (±0.002)
Vacuum Collection (M-Vac®)	36 (±12)	0.6 (±0.5)	0.08 (±0.08)	0.03 (±0.02)

(2 Standard Deviations)

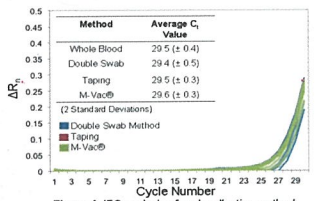


Figure 4. IPC analysis of each collection method from a non-porous substrate (tile).

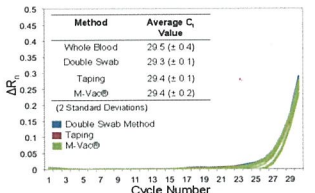


Figure 5. IPC analysis of each collection method from denim.

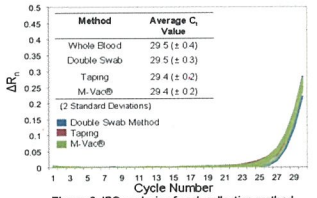


Figure 6. IPC analysis of each collection method from carpet.

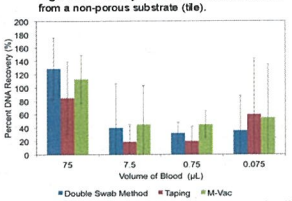


Figure 7. Percent DNA recovery of blood (0.075 – 75 µL) using various collection methods on tile with error bars representing the 2SD calculated using the theory of propagation of random error.

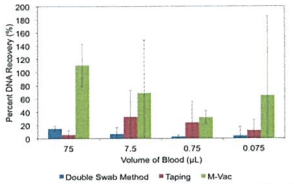


Figure 8. Percent DNA recovery of blood (0.075 – 75 µL) using various collection methods on denim with error bars representing the 2SD calculated using the theory of propagation of random error.

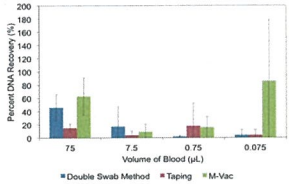


Figure 9. Percent DNA recovery of blood (0.075 – 75 µL) using various collection methods on carpet with error bars representing the 2SD calculated using the theory of propagation of random error.

Conclusions

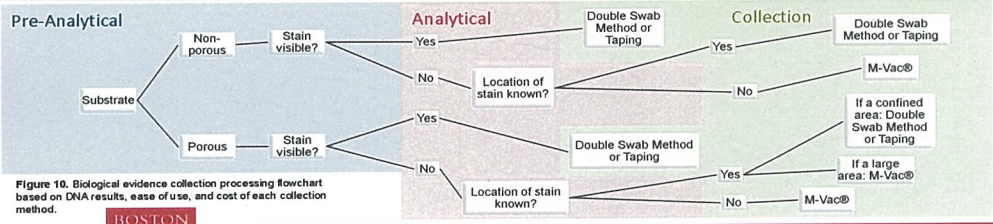


Figure 10. Biological evidence collection processing flowchart based on DNA results, ease of use, and cost of each collection method.

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Methods

- 75 µL of the appropriate blood dilution was spotted on each substrate (tile, denim & carpet), allowed to dry, and then collected using the double swab method, taping, or the M-Vac®. Therefore, the representative volume of blood tested was 75 µL, 7.5 µL, 0.75 µL, and 0.075 µL.
- Extraction performed using QiAmp® Investigator extraction protocol (Qiagen, Valencia, CA).
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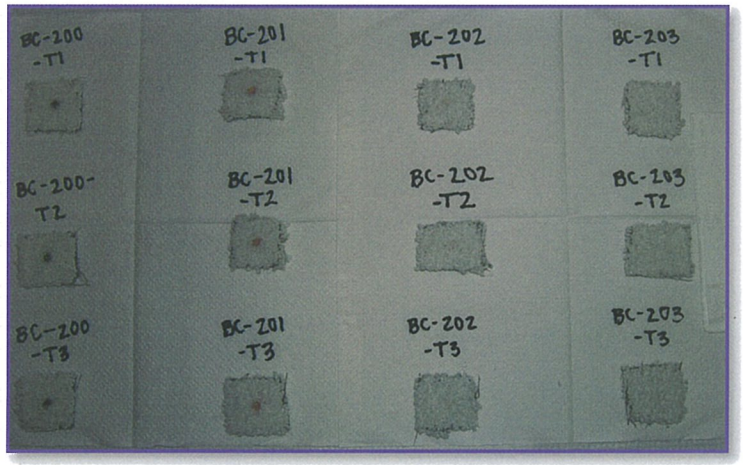

Results

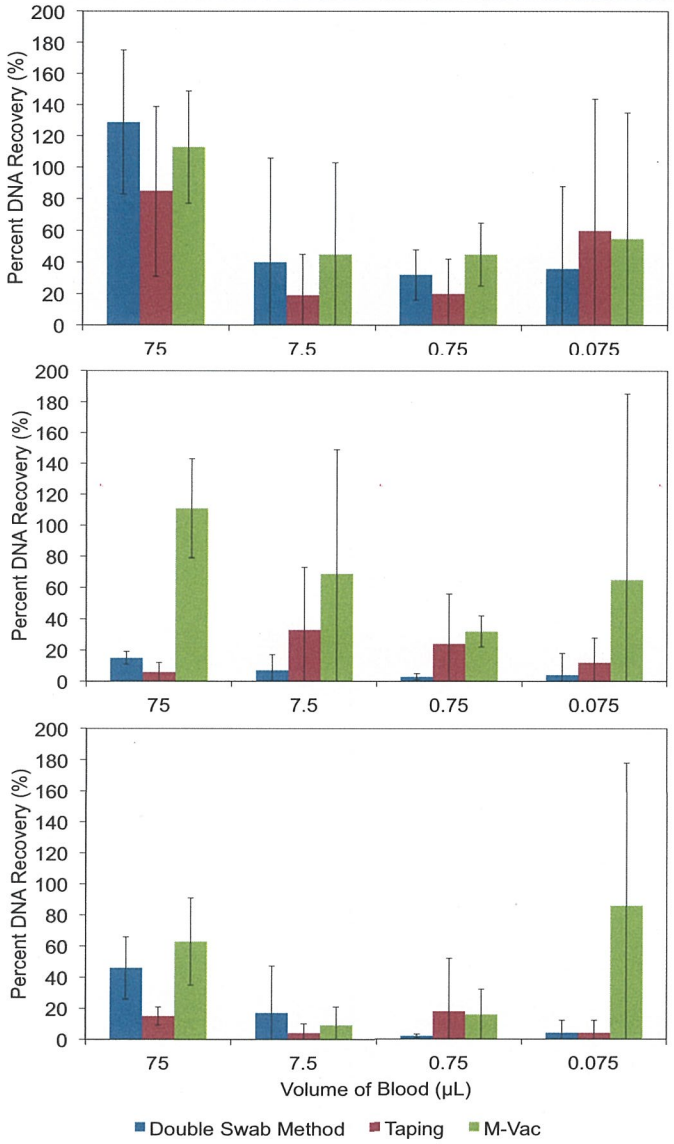

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Figure 8. Percent DNA recovery of blood (0.075 – 75 µL) using various collection methods on denim with error bars representing the 2SD calculated using the theory of propagation of random error.

Figure 9. Percent DNA recovery of blood (0.075 – 75 µL) using various collection methods on carpet with error bars representing the 2SD calculated using the theory of propagation of random error.

Results - Tile

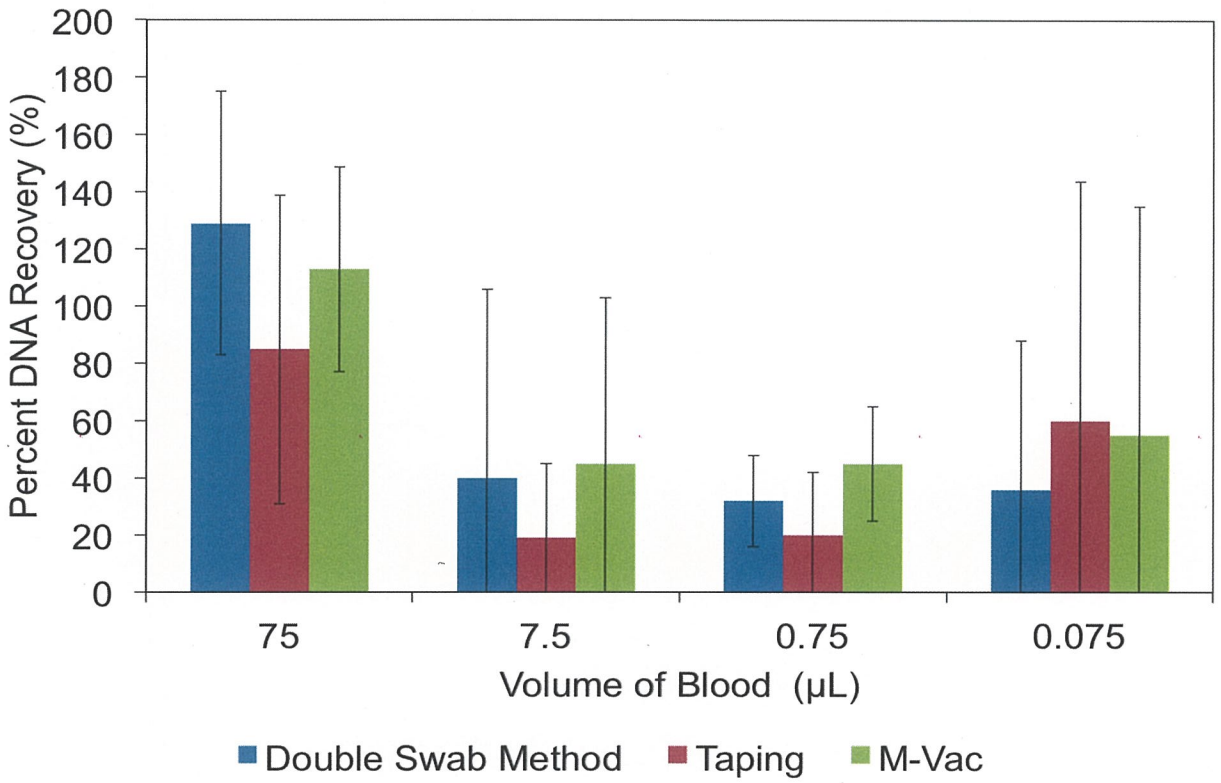

Figure 7. Percent DNA recovery of blood (0.075 – 75 µL) using various collection methods on tile with error bars representing the 2SD calculated using the theory of propagation of random error.

Results - Denim

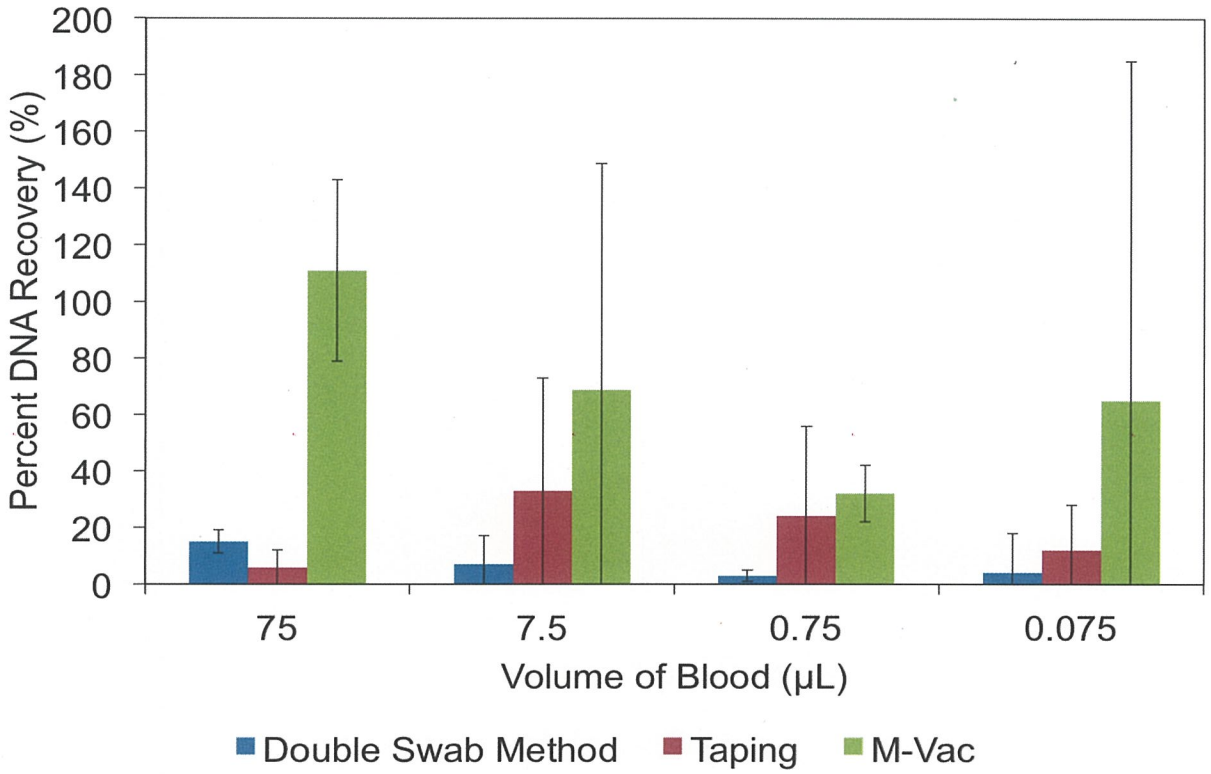

Figure 8. Percent DNA recovery of blood (0.075 – 75 µL) using various collection methods on denim with error bars representing the 2SD calculated using the theory of propagation of random error.

Results - Carpet

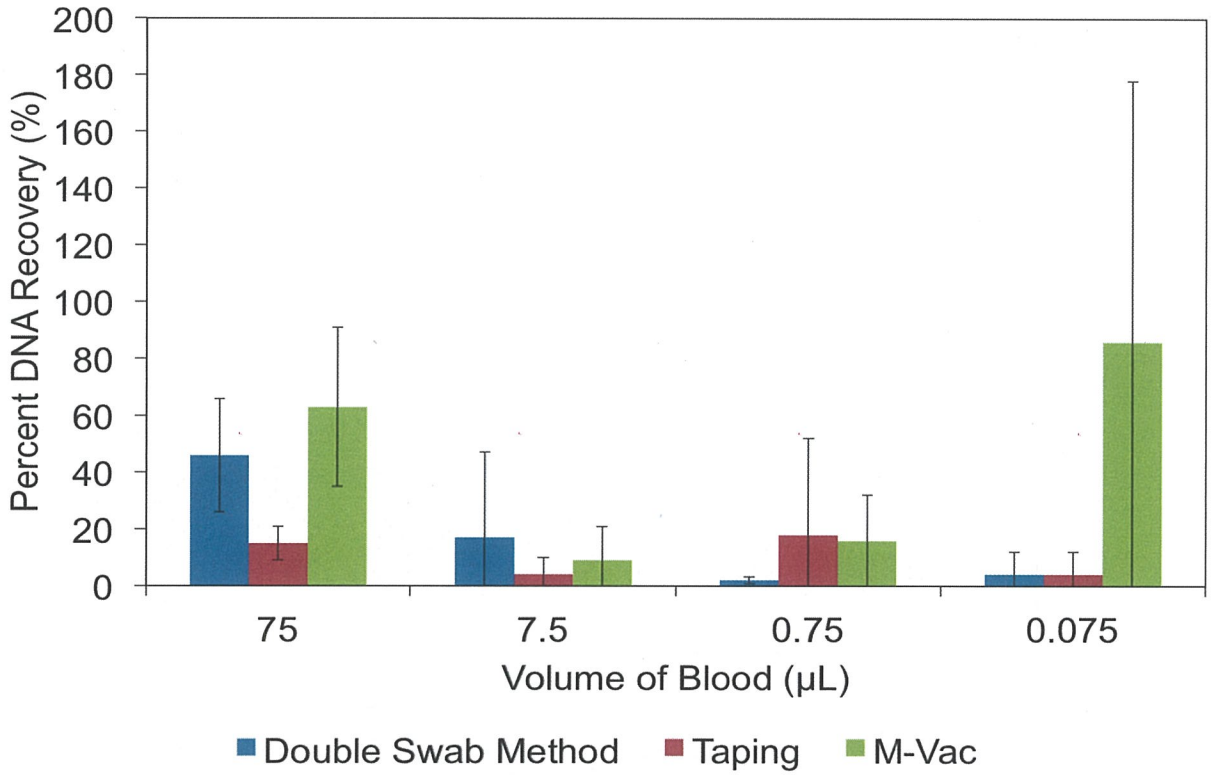

Figure 9. Percent DNA recovery of blood (0.075 – 75 µL) using various collection methods on carpet with error bars representing the 2SD calculated using the theory of propagation of random error.

Results - Data

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(2 Standard Deviations)

Table 3. Average concentrations of blood (0.075 – 75 µL) collected from carpet using various collection methods (in ng/µL).

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Conclusions

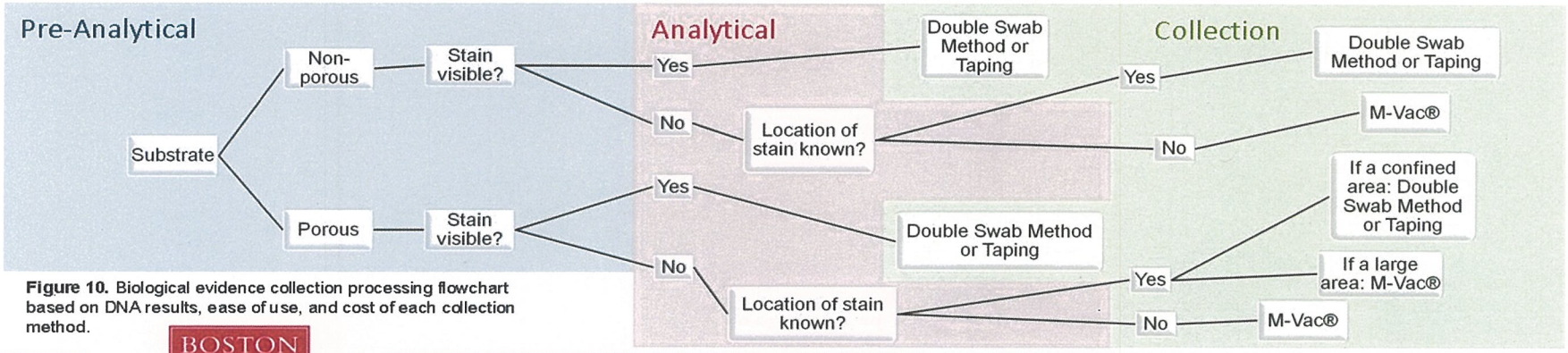

Figure 10. Biological evidence collection processing flowchart based on DNA results, ease of use, and cost of each collection method.

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