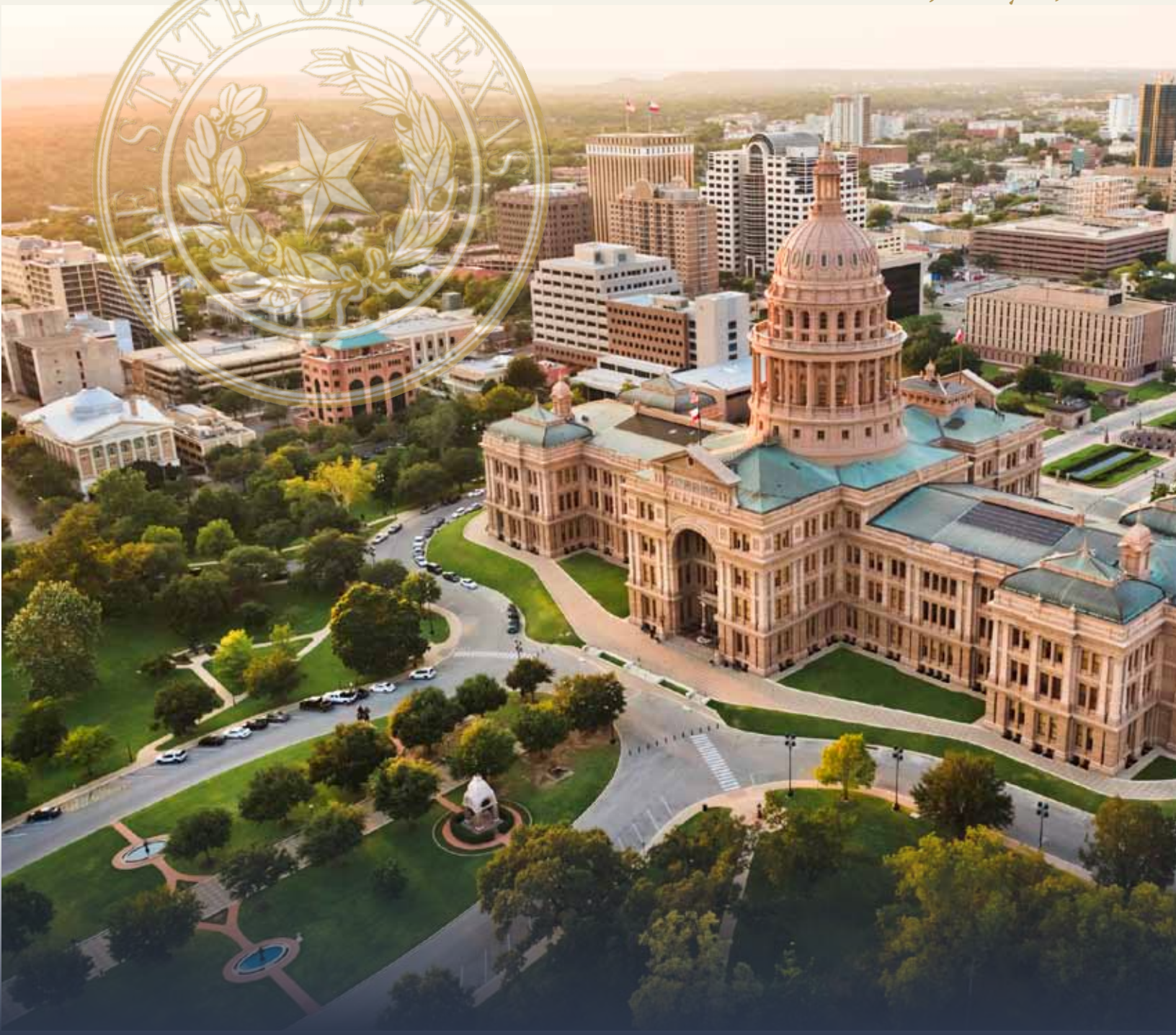
Texas Forensic Science Commission

Justice Through Science

FINAL REPORT ON COMPLAINT NO. 21.32, HARRIS COUNTY PUBLIC DEFENDER'S OFFICE FOR THEODORE SCHMIDT (DR. MELBA KETCHUM; CANINE DNA)

January 21, 2022



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I. COMMISSION BACKGROUND

A. History and Mission of the Texas Forensic Science Commission

The Texas Forensic Science Commission ("Commission") was created during the 79th Legislative Session in 2005 with the passage of HB-1068. The Act amended the Texas Code of Criminal Procedure to add Article 38.01, which describes the composition and authority of the Commission.[1] During subsequent legislative sessions, the Texas Legislature further amended the Code of Criminal Procedure to clarify and expand the Commission's jurisdictional responsibilities and authority.[2]

Texas law requires the Commission to "investigate, in a timely manner, any allegation of professional negligence or professional misconduct that would substantially affect the integrity of the results of a forensic analysis conducted by a crime laboratory."[3] The Commission is also required to develop and implement a reporting system through which a crime laboratory must report professional negligence or professional misconduct and require crime laboratories that conduct forensic analyses to report professional negligence or professional misconduct.[4]

The term "forensic analysis" is defined as a medical, chemical, toxicological, ballistic, or other expert examination or test performed on physical evidence, including DNA evidence, for the purpose of determining the connection of the evidence to a criminal action.[5] The statute excludes certain types of analyses from the "forensic analysis" definition, such as latent fingerprint analysis, a breath test specimen, and the portion of an autopsy conducted by a medical examiner or

[1] *See*, Act of May 30, 2005, 79th Leg., R.S., ch.1224, § 1 (2005).
[2] See, *e.g.,* Acts 2013, 83rd Leg. Ch. 782 (SB 1238) §§ 1-4 (2013); Acts 2015, 84th Leg. Ch. 1276 (S.B. 1287) §§ 1-7 (2015); TEX. CODE CRIM. PROC. art. 38.01 § 4-1(b).
[3] TEX. CODE CRIM. PROC. art. 38.01 § 4(a)(3).
[4] *Id*. at § 4(a)(1)-(2).
[5] TEX. CODE CRIM. PROC. art. 38.35(a)(4).

licensed physician.[6] The statute does not define the terms "professional negligence" and "professional misconduct." The Commission has defined those terms in its administrative rules.[7]

The Commission has nine members appointed by the Governor of Texas.[8] Seven members are scientists or medical doctors and two are attorneys (one prosecutor nominated by the Texas District and County Attorney's Association and one criminal defense attorney nominated by the Texas Criminal Defense Lawyer's Association).[9] The Commission's Presiding Officer is Jeffrey Barnard, MD. Dr. Barnard is the Chief Medical Examiner of Dallas County and Director of the Southwestern Institute of Forensic Sciences in Dallas.

B. Investigative Process

The Commission's administrative rules set forth the process by which it decides whether to accept a complaint or self-disclosure for investigation as well as the process used to conduct the investigation.[10] The ultimate result is the issuance of a final report. The Commission's administrative rules describe the process for appealing final investigative reports.[11]

C. Accreditation Jurisdiction

The Texas Code of Criminal Procedure prohibits forensic analysis from being admitted in criminal cases if the crime laboratory conducting the analysis is not accredited by the

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[6] For a complete list of statutory exclusions see TEX. CODE CRIM. PROC. art. 38.35 (a)(4)(A)-(F) and (f).

[7] "Professional Misconduct" means the forensic analyst or crime laboratory, through a material act or omission, deliberately failed to follow the standard of practice that an ordinary forensic analyst or crime laboratory would have followed, and the deliberate act or omission would substantially affect the integrity of the results of a forensic analysis. An act or omission was deliberate if the forensic analyst was aware of and consciously disregarded an accepted standard of practice required for a forensic analysis. "Professional negligence" means the forensic analyst or crime laboratory, through a material act or omission, negligently failed to follow the standard of practice that an ordinary forensic analysts or crime laboratory would have followed, and the negligent act or omission would substantially affect the integrity of the results of a forensic analysis. An at or omission was negligent if the forensic analyst should have been aware but was not aware of the accepted standard of practice. 37 Tex. Admin. Code § 651.302 (7) and (8) (2020).

[8] TEX. CODE CRIM. PROC. art. 38.01 § 3.

[9] *Id.*

[10] *See*, 37 Tex. Admin. Code § 651.304-307 (2019).

[11] *Id.* at § 651.309.

Commission.[12] The term "crime laboratory" includes a public or private laboratory or other entity that conducts a forensic analysis subject to this article.[13]

D. Jurisdiction Applicable to this Complaint

The forensic discipline discussed in this final investigative report, Forensic Biology/DNA Analysis, is subject to the accreditation authority of the Commission.[14] The individual against whom the complaint was filed, Dr. Melba Ketchum ("Ketchum"), was the president and director of a private laboratory in Timpson, Texas named DNA Diagnostics, Inc. The laboratory was not accredited by any recognized accrediting body at the time of the forensic analysis and testimony that is the subject of this complaint.[15]

E. Limitations of this Report

The Commission's authority contains important statutory limitations. For example, no finding by the Commission constitutes a comment upon the guilt or innocence of any individual.[16] The Commission's written reports are not admissible in civil or criminal actions.[17] The Commission has no authority to subpoena documents or testimony. The information the Commission receives during any investigation is dependent on the willingness of stakeholders to submit relevant documents and respond to questions posed. The information gathered in this report has not been subject to the standards for admission of evidence in a courtroom. For example,

[12] TEX. CODE CRIM. PROC. art. 38.35 § (d)(1).
[13] *Id.* at 38.35 § (a)(1).
[14] 37 Tex. Admin Code § 651.219 §(b)(3) (2010). Before the effective date of this administrative rule, the Texas Department of Public Safety was the accreditation authority for crime laboratories. The citation for administrative rules regarding accreditation promulgated by DPS is 28 Tex. Admin. Code § 28.245 (b)(3) (2004). The rule change in 2010 reflected the transfer of accreditation authority from Title 37, Part 1, Chapter 28 to Part 15, Chapter 651. The rule changes were adopted pursuant to Senate Bill 1287, which was passed by the 84th Texas Legislature. (*See,* Tex. S.B. 1287, 84th Leg., R.S. (2015)).
[15] The applicable accrediting body during the timeframe in question was the American Society of Crime Laboratory Directors ("ASCLD/LAB").
[16] TEX. CODE CRIM. PROC. art 38.01 § (4)(g).
[17] *Id.* at § 11.

no individual testified under oath, was limited by either the Texas or Federal Rules of Evidence (*e.g.*, against the admission of hearsay) or was subject to cross-examination under a judge's supervision.

II. SUMMARY OF COMPLAINT

A. Complaint and UC Davis Report

On June 1, 2021, the Harris County Public Defender's Office ("HCPDO") filed a complaint on behalf of convicted capital murder defendant Theodore Schmidt alleging professional misconduct against Dr. Melba Ketchum ("Ketchum"). The HCPDO alleges Ketchum committed misconduct when she testified about the forensic analysis of canine DNA while knowing her laboratory was not accredited under Texas law. The complaint also alleges Ketchum presented incomplete and misleading testimony regarding the DNA analysis in the case by failing to explain the limitations of her opinion, including the rarity of the mitochondrial haplotype sequences she observed according to available canine population data.

In support of these allegations, HCPDO submitted a letter from Christina Lindquist, Director of the Veterinary Genetics Laboratory at the University of California Davis School of Veterinary Medicine ("UC Davis"). *See*, **Exhibit A**. In the letter, Lindquist details the history of accreditation in the field of non-human DNA analysis. The first laboratory in the United States to be accredited by the American Society of Crime Laboratory Directors/Laboratory Accreditation Board ("ASCLD/LAB")[18] for work on non-human samples was the United States Fish and Wildlife Forensics Laboratory ("USFWL") in 1997. After receiving accreditation, the USFWL initiated an in-house proficiency testing program. In 2004, the laboratory made this proficiency

[18] ASCLD/LAB merged with the ANAB/ANSI National Accreditation Board in April 2016. The accrediting body in place during the forensic analysis and related testimony described in this report was ASCLD/LAB. It is now referred to as ANAB.

testing program available to other interested non-human DNA laboratories. With respect to the allegation regarding statistics, Lindquist asserts that all mitochondrial haplotype conclusions must have a statement regarding the rarity of the haplotype observed to avoid misleading the trier of fact, and that sequences cannot be used to individualize a particular dog as having contributed DNA to an evidentiary sample. Lindquist points out that this limitation is important to express clearly because some of the more common haplotypes can be present in up to 1 in 6 dogs.

B. Underlying Criminal Case

The criminal case that is the subject of this complaint is a capital murder where the identity of the assailant was in question.[19] Law enforcement found the victim in a ditch along a roadway. Her wrists were bound together with duct tape, and duct tape was wrapped in multiple, separate layers around her head, covering her eyes. She had a single gunshot wound to the back of her head.

A surveillance video captured footage of the defendant and the victim at a store before the murder. During the execution of a search warrant, police recovered clothing of the defendant believed to be the clothing he was wearing in the video. Investigators found what appeared to be dog hair on the defendant's jacket and shirt. At trial, Ketchum testified that hair from the defendant's clothing had the "identical DNA sequence" as hair recovered from the victim's clothing and a reference sample taken from the victim's dog.

C. Summary of Ketchum Testimony in the Schmidt Trial

Ketchum testified her laboratory was not accredited when the DNA analysis in this case was performed because there was no provider of animal proficiency testing, a component

[19] *Schmidt v. State*, 2012 Tex. App. LEXIS 2056 (Tex. App. - Houston 14th Dist. 2012) (unpublished), pdr. ref'd.

requirement for obtaining accreditation. According to her testimony, "…no animal lab that does forensics in the entire world...is accredited."[20]

Ketchum also testified that non-human hairs recovered from the victim's clothing and buccal swabs from the victim's dog "…had the identical [mitochondrial] DNA sequence" as non-human hairs recovered from the defendant's clothing.

Ketchum testified that she chose not to provide statistics related to her conclusion "…because there can be a small amount of variance depending on geography and the breed of dog." Ketchum testified that, "without using a database that is local to the animal and of the same type of animal," she does not provide statistics related to the frequency of the DNA sequence in the population.

III. COMMISSION INVESTIGATION

At its July 16, 2021, quarterly meeting, the Commission voted to form an investigative panel ("Panel") to assist in determining whether the HCPDO's allegations are supported by the facts and circumstances, available data, and related documentation. The Panel included Bruce Budowle, Ph.D., Michael Coble, Ph.D., and Mark Daniel, Esq.

A. Investigative Notice, Interview and Records Request

The Commission notified Ketchum it accepted the complaint for investigation on July 28, 2021. **(Exhibit B, Letter to Ketchum)**. The letter extended a request to interview Ketchum. On August 11, 2021, the Commission requested from Ketchum the laboratory casefile, including any mitochondrial sequence data, and any database data Ketchum accessed for comparison. (**Exhibit C, Record Request Letter to Ketchum**).

[20] Ketchum clarified this statement by testifying that "no animal lab that does forensics in the entire world at this point is accredited that is either – now, a Governmental lab is different. But as far as anybody that's doing criminal cases like our lab does, they are not accredited." (*See*, **Exhibit D: Transcript of Melba Ketchum Testimony,** p. 167).

B. Witness Interview

The Panel interviewed Christina Lindquist ("Lindquist") on September 22, 2021. Lindquist is the current quality manager and former director of the Veterinary Genetics Laboratory at the UC Davis School of Veterinary Medicine at the time of the case discussed herein. Lindquist explained that the technique used in canine DNA analysis is very similar to the technique used in human DNA analysis. As with human STR (short tandem repeat) and mitochondrial DNA analysis, forensic analysts provide statistics with canine DNA results to provide the trier of fact an understanding of the relative rarity of the data observed. The frequency of certain characteristics in a canine DNA sample can be compared to a database. UC Davis built their own database that Lindquist claims is sufficiently robust to provide reliable statistics for most regions. Lindquist acknowledged the best practice for collection of canine population data is to build a local database that is representative of the local population. However, in the absence of sufficient local data it is widely accepted that the use of any available population data is more informative and provides better context to the trier of fact than not providing any population data-based statistics at all.

Lindquist explained her view that Ketchum's testimony that DNA sequences were "identical" was technically correct but misleading absent a quantitative statement expressing the significance of the finding. She further asserted that analysts are expected to be completely transparent about the significance of their results. Lindquist explained Ketchum could have easily referenced a published database related to the frequency of the profile obtained in her analysis. While acknowledging the use of a database outside the local region is less reliable and accurate than a local database, Ketchum could have at least provided the trier of fact an understanding of the significance (or lack thereof) of the "identical sequences."

Lindquist also explained that accreditation options were available to Ketchum's lab at the time of the analysis. She explained that proficiency testing was part of the accreditation process and that initially the USFWL proficiency testing program focused on traditional wildlife such as deer, bear, and exotic animals. Some laboratories used this proficiency testing, while others developed their own internal proficiency testing programs. The internal proficiency testing program at UC Davis focuses on cats, dogs, and horses, but the tests have not been standardized for use in other laboratories.

C. Communication with ANAB

Commission staff sought input from ANAB regarding the history of accreditation for non-human DNA analysis. According to ANAB's records, Texas Parks and Wildlife obtained accreditation in non-human DNA analysis in 2006 and the National Fish and Wildlife Laboratory obtained accreditation in non-human DNA in 2007. UC Davis obtained accreditation in non-human DNA in July 2010 (the same month as the Schmidt trial). **(Exhibit E, Email from Pamela Sale).**

D. Interview of Dr. Ketchum

Before the Commission's July 16, 2021, quarterly meeting, Ketchum responded to the allegations in a brief email. **(Exhibit F, 7/15/21 Email from Ketchum)**. She also relayed her difficulty in supplying case records and related data requested by the Commission due to the passage of time and impact of various natural disasters in the Houston area. The Panel interviewed Ketchum on December 3, 2021. She stated her laboratory performed both human and animal DNA analysis and her clients consisted of both prosecutorial and defense representatives. In the Schmidt case, her involvement began when she was contacted by the prosecutor who sought testing on dog hair related to the case.

Ketchum's laboratory began conducting forensic analysis in 1995. The laboratory performed both STR and mitochondrial DNA testing. Ketchum explained that she tried to achieve accreditation on behalf of the laboratory but was unable to do so because she could not obtain the requisite proficiency testing in non-human DNA analysis. The analysts in her laboratory participated in external human DNA proficiency tests only.[21] Ketchum claimed she made various attempts to contact USFWL to participate in their proficiency testing program but was never able to secure the tests. Her laboratory developed its own internal proficiency program but Ketchum concluded those tests would not be considered sufficient for ASCLD/LAB accreditation because they were developed internally and not by a third-party. Ketchum knew at the time of her testimony in the Schmidt case that Texas law required accreditation for DNA analysis but believed the ASCLD/LAB accreditation program was unattainable for a small, private lab such as hers.

At the time of the Schmidt case, Ketchum's laboratory was in the process of developing a local mitochondrial DNA database for animals. However, she did not feel comfortable providing a statistic based on the available local data because she believed the database was insufficiently robust. She acknowledged there were other published databases available containing far more data, but she declined to utilize any of them due to her concerns regarding canine population variations from region to region. Ketchum told the prosecutor that her recommended course of action would be to develop a local database for the purposes of providing a quantitative statement in this case, but the prosecutor did not want to expend resources on data collection. Ketchum decided to testify, but without offering any statistical significance regarding her observations.

At the close of the Panel's interview, Ketchum apologized for any testimony she provided that was inadequate or unclear in expressing the limitations of her findings. She stated that she

[21] While companies like CTS provide proficiency testing in many forensic disciplines, they did not offer non-human DNA proficiency tests.

did not intend to mislead the trier of fact when she testified that the DNA sequences were "identical" but in retrospect could see how the term could mislead a lay jury or judge.

IV. COMMISSION FINDINGS

A. Texas Requirement of Accreditation for DNA Testing

The preamble to the 2005 enabling legislation establishing the Texas Forensic Science Commission (HB 1068) provided it was an act relating to the collection and analysis of evidence and testimony based on forensic analysis, crime laboratory accreditation, DNA testing, and the creation and maintenance of DNA records. The same legislation amended Article 38.35 of the Texas Code of Criminal Procedure to provide that forensic analysis and expert testimony related thereto are not admissible if the crime laboratory conducting the analysis was not accredited. Nothing in the legislation, subsequent amendment or administrative rules, exempts non-human DNA testing from this requirement. Notwithstanding this observation, Article 38.35 governs the admissibility of evidence in criminal actions. It is the role of the trial judge as gatekeeper (not the Commission) to admit or exclude evidence—including testimony—under Article 38.35 of the Code.[22]

B. Determination Regarding Professional Misconduct or Professional Negligence

"Professional Misconduct" means the analyst or crime laboratory through a material act or omission, deliberately failed to follow a standard of practice that an ordinary forensic analyst or crime laboratory would have followed, and the deliberate act or omission would substantially affect the integrity of the results of a forensic analysis. An act or omission was deliberate if the forensic analyst or crime laboratory was aware of and consciously disregarded an accepted standard of practice.[23]

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[22] *See*, Kelly v. State, 824 S.W.2d 568 (Tex. Cr. App. 1992).
[23] 37 Tex. Admin Code § 651.302 (7) (2020).

"Professional Negligence" means the analyst or crime laboratory through a material act or omission, negligently failed to follow a standard of practice that an ordinary forensic analyst or crime laboratory would have followed, and the negligent act or omission would substantially affect the integrity of the results of a forensic analysis. An act or omission was negligent if the forensic analyst or crime laboratory should have been aware of an accepted standard of practice.[24]

1. Finding of Professional Negligence Regarding Failure to Obtain Accreditation

Article 38.35 is a rule of admissibility that requires the proper predicate objection and court ruling. The trial court heard testimony from Ketchum outside the presence of the jury. Absent objection under Article 38.35, the court evaluated the testimony regarding the analysis under applicable scientific evidence standards (*i.e.,* the *Daubert* standard)[25] and found it was admissible. Ketchum was forthcoming in her admission under oath that her laboratory was not accredited. Interviews with Ketchum revealed her mistaken belief that her laboratory could not achieve accreditation as a practical matter due to the lack of available non-human DNA proficiency tests, and that only government labs were capable of achieving accreditation by ASCLD/LAB. While the Commission recognizes that her assumptions are not supported by information provided by ASCLD/LAB, there is insufficient evidence to conclude that her laboratory's inability to obtain accreditation during the time period in question constitutes professional misconduct.

Assessing professional negligence is necessarily difficult because it is a context-driven analysis that is dependent on the weight accorded to various factors. The Commission recognizes the criminal justice system is not well-served by punitive oversight that discourages analysts from admitting mistakes for fear of adverse consequences. Because the Commission's core values

[24] 37 Tex. Admin. Code § 651.302 (8) (2020).
[25] *See*, Daubert v. Merrell Dow Pharmaceuticals, Inc. 509 U.S. 579 (1993). *See also,* Kelly v. State, *supra* note 20.

include transparency and collaboration, members have always exercised restraint in using their discretion to issue a professional negligence finding.

In this case, the Commission received unequivocal information from the accrediting body that accreditation in non-human DNA was available and attainable for any qualified laboratory at the time of the forensic analysis performed in the Schmidt case. Whatever efforts Ketchum made to participate in the USFWL proficiency program fell short. The Commission's list of accredited laboratories contains a diverse range of laboratory sizes and types. While it is undoubtedly more challenging for a small laboratory to obtain accreditation, there are examples of Texas laboratories with as few as two people that have done so in other forensic disciplines. Accreditation is such a fundamental requirement that it is codified in Texas law as a predicate to the admission of forensic analysis and related testimony. The Commission finds Ketchum was professionally negligent in failing to achieve accreditation for the laboratory before performing forensic analysis and offering related testimony.

2. Finding of Professional Misconduct Regarding Testimony

Ketchum's trial testimony expanded considerably upon her written report issued earlier the same year. The report concluded that "the evidentiary samples tested cannot be excluded as being from the known dog...." (**Exhibit G, Ketchum DNA Report**). At trial she testified that the DNA sequences from the evidentiary items were "identical" to the reference samples, without providing any limitations regarding this qualitative statement or providing any quantitative statement (i.e., statistical weight) regarding the outcome of her comparison of the known dog profile to the evidentiary sample collected from the victim's clothing.

Ketchum co-authored a paper in 2005 addressing the need for both qualitative and quantitative statements in the context of non-human DNA forensics.[26] In pertinent part, the paper states the following:

> When interpreting forensic evidence…a qualitative and quantitative statement about the outcome of the analysis should be provided. The general approaches to these statements should be contained in the interpretation section of the SOP.
>
> Population data are required to estimate the frequency of alleles for each locus. The reference databases typically are comprised of samples of "unrelated" individuals that are conveniently acquired. Because inferences of rarity are based on the sample population analyzed and assumptions of relevance and representativeness are basic to identity testing, the reference population data used should be cited. The reference database needs to be defined with reference to how it was constructed. For example, dogs are not as mobile as their human counterparts and only a small percentage of dogs have offspring. In addition, veterinarians may describe a dog's breed by the predominant breed features, even if there is evidence of a mixture. Thus, the assumptions of the database need to be disclosed. One can make assumptions on the estimates of inbreeding. However, access to population data can provide empirical information on the degree of inbreeding to effect better statistical estimates. The population data (i.e., the DNA profiles) should be made available upon request for review.
>
> When a comparison of DNA profiles derived from unknown and reference samples fails to exclude an individual as a contributor of the evidence sample or as biologically related, a statistical assessment and/or probabilistic reasoning are used to convey the significance of the finding.

Because the case records maintained by the laboratory are no longer available, the Commission is unable to assess the quality of the data interpretation in the case. However, regardless of what the data show, a fact finder could easily be misled to believe that "identical DNA sequences" means the same thing as individual identification in the absence of clarifying

[26] *See*, Bruce Budowle, et. al., Recommendations for animal DNA forensic and identity testing, Int. J. Legal Med (2005) 119: 295-302.

information. Ketchum claims she was unwilling to provide a statistical weight in this case due to her concern that the internal local database had too few DNA profiles and other databases outside the region lacked reliability due to population variation. She should have been similarly concerned that testifying without a quantitative statement regarding the significance of her findings contradicted established principles in mitochondrial DNA analysis and reporting. If the available data were truly insufficient, the most prudent course would have been to decline to offer any qualitative assessment, much less one with a high risk of misleading the trier of fact.

The Commission finds the testimony of Ketchum in the Schmidt trial was incomplete and posed a substantial risk of misleading the trier of fact. The Commission also finds Ketchum was aware of and consciously disregarded the accepted standard of practice as set forth in the peer-reviewed article she co-authored. Ketchum's testimony constituted professional misconduct because she was aware of and consciously disregarded an accepted standard of practice in failing to provide a quantitative statement about the outcome of her analysis.

V. OBSERVATIONS AND RECOMMENDATIONS

Dr. Ketchum is retired from the forensic DNA profession and her laboratory is no longer operational. Thus, the Commission has only one recommendation directly applicable to Dr. Ketchum. During her interview, Ketchum noted with sincerity that she did not intend to mislead the trier of fact in any way but could understand how a lay jury or judge might misunderstand her description of the reference and evidentiary samples as containing "identical DNA sequences," mistaking the term for a statement of source attribution. The Commission recommends Dr. Ketchum consider working with the stakeholders to issue a correction and clarification regarding the testimony offered at trial. Accredited laboratories offer corrections as needed to meet their duty

to correct in circumstances where misleading information may have been provided. Dr. Ketchum could provide a similar correction/clarification in this case.

The following expectations are offered as reminders to currently practicing forensic analysts in Texas. Analysts should:

- Testify in a manner which is clear, straightforward and objective, and avoid phrasing in an ambiguous, biased or misleading manner.[27]
- Prepare reports in clear terms, distinguishing data from interpretations and opinions, and disclosing any relevant limitations to guard against making invalid inferences or misleading the judge or jury.[28]
- Present accurate and complete data in reports, oral and written presentations and testimony based on good scientific practices and valid methods.[29]
- Not change a result or opinion during testimony without issuing a supplemental report, except where the change is occasioned by new information presented during testimony and not previously known by the expert.[30]

[27] *See*, 37 Tex. Admin. Code § 651.219(b)(10) (2020).
[28] *Id.* at § 651.219(b)(12) (2020).
[29] *Id.* at § 651.219(b) (13) (2020).
[30] *See e.g.,* OSAC 2022-S-0013 Standard Guide for Testimony by Forensic Science Practitioners Offering Expert Testimony in Seized Drugs Analysis.

EXHIBIT A

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April 8, 2021

Re: Inquiry regarding canine DNA testing in 2010

Hello Mr. Connelly,

Thank you for your inquiry. I will do my best to describe my understanding of our discipline (forensic non-human DNA) in 2010. I started working at the Veterinary Genetics Laboratory-Forensics in 2006, and in 2010 I was completing forensic casework at the bench and had not yet taken on data interpretation and reporting duties. Each case was worked by someone at the bench and a Forensic Analyst who reviews the data, completes interpretation and writes the report. The Forensic Analyst is the one who communicates with counsel when testimony is required and thus has the most complete perspective on the state of our discipline, but the Forensic Analyst at our lab in 2010 is now retired and unavailable. I will recount, in her stead, the history as I know it.

Accreditation in the field of non-human forensic DNA analysis

The first laboratory in the United States to be accredited for work non-human samples was the US Fish and Wildlife Forensics Laboratory who was accredited by ASCLD/LAB in 1997. Since the USFWFL has always been the leader of the field of wildlife forensic DNA analysis, prioritizing and attaining accreditation sent a clear message to the entire non-human (often termed "wildlife" even when it includes domesticated animals) DNA community that accreditation was within reach and something that had to be done in order to continue to complete casework in the US.

Our laboratory started preparing for accreditation before I was hired, but until I took on the project in 2008 there was not much progress. We implemented a compliant management system in early 2009, applied for accreditation with ASCLD/LAB in August 2009, had our site visit in April 2010, and obtained accreditation in July 2010. We were the first laboratory accredited in domestic animal forensic DNA testing.

Prior to accreditation, and since the founding of our forensics lab in 2000, our lab was well aware of the requirement to keep detailed case notes, records, equipment records, chain of custody, and data analysis records and always presented this information, the full case file, to counsel in preparation for testimony. Our lab was also aware of the accreditation requirement in Texas, and in preparation for working a case sent from Texas, we obtained full DPS Accreditation in 2012.

Non-human forensic DNA laboratories are always small, with limited personnel and resources (with the exception of USFWFL), which has meant that the transition to accreditation in the non-human DNA field has been a long one. In the last couple of years, more non-human DNA laboratories have been able to find the required dedicated time and resources to obtain accreditation, but that has now been 20 years in the making.

Professional society and publication in non-human forensic DNA analysis

The Society for Wildlife Forensic Science (SWFS) was founded in 2009 when it became clear that the growing non-human forensic DNA community needed a dedicated society. Up until then, laboratories participated in AAFS and Promega, which was helpful in that the same technology was being used, but did not have a dedicated space for non-human DNA casework. The SWFS was founded to be highly international due to the fact that (a) the wildlife side of the field (as opposed to domestic animals) was involved in enforcement of international regulations (CITES- endangered species regulations) and that (b) there are relatively few practitioners world-wide.

In terms of publication, the Journal of Forensic Science as well as Forensic Science International were strong and flourishing in 2010 and were accepting and publishing quality publications from the non-human forensic DNA community. Of note, abstracts submitted to Promega and/or AAFS are not peer-reviewed.

Proficiency testing in the field of non-human forensic DNA analysis

As part of their preparation for accreditation, the USFWFS started a proficiency testing program which became open to everyone in the discipline in 2004. Our lab participated in the program from its founding and assisted in pre-distribution exercises to grow the program. The mammal test in this program is always a wildlife species (for example, deer, elk or bear), and this species-focus has continued to present day. It became clear that laboratories would need to supplement this external proficiency test with internal ones specific to the species they test most (for example, canines). We implemented our own internal proficiency test to complement the external one in 2011.

This proficiency testing program, created by the USFWFS, is still operational and is now run by the Society for Wildlife Forensics Science (https://www.wildlifeforensicscience.org/proficiency-testing/). Until 2 years ago when the ENFSI (the European equivalent to the AAFS) started a non-human traces proficiency test, the SWFS proficiency test program was the only externally provided proficiency testing program in the field of non-human forensic DNA testing.

Qualifying conclusions in mitochondrial haplotyping

Qualifying of conclusions has been the standard for human and non-human DNA disciplines since prior to the 2006 ASCLD/LAB Supplemental requirements. It is inappropriate to present a mitochondrial haplotype conclusion without an associated qualification as the weight of the evidence. Reporting a sequence result for the HV1/HV2 region in canids by stating that the sequence is the same is very misleading to the court.

All mitochondrial haplotyping conclusions have to have a statement regarding the rarity of the haplotype observed. In canids in particular, some of the more common haplotypes can be present in up to 1 in 6 dogs. The mitochondrial sequence cannot be used to individualize a sample; the strongest conclusion that can be given is that "the unknown sample has the same haplotype as the reference sample and the frequency of that haplotype in the domestic canid population is estimated to be ___", or similar with an identification of the database used to calculate that rarity.

Neither I nor my staff have had any direct interactions with Dr. Ketchum, only hearsay from coworkers at the time which I will not share here.

For more detailed information regarding the participation of Dr. Ketchum in the early activities of the USFWFL proficiency test and the Society for Wildlife Forensic Science, please reach out to the board of

the Society for Wildlife Forensic Science (SWFS) or to the genetic section at the USFWFL, as they may have had direct interactions with her at the time of this case.

I hope that this information is helpful to you in your investigation. Thank you for contacting us, and if you locate any samples from the case and would like them tested, I can provide you with submission information.

Sincerely,

C Lindquist

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EXHIBIT B

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SCIENCE COMMISSION
Justice Through Science
1700 North Congress Ave., Suite 445
Austin, Texas 78701

July 28, 2021

Via e-mail to hotdoc2255@gmail.com and FedEx

Melba Ketchum, Ph.D.
646 Harris Ridge Drive
Arlington, Texas 76002

Re: Texas Forensic Science Commission Complaint No. 21.32; Harris County Public Defenders Office on behalf of defendant Theodore Schmidt

Dear Dr. Ketchum:

At its July 16, 2021 quarterly meeting, the Forensic Science Commission ("Commission") voted to accept the referenced complaint for investigation. The Commission will investigate whether the allegations in the complaint are supported. Specifically, the Commission will consider the allegation that you committed "professional negligence"[1] or "professional misconduct"[2] when performing forensic analysis[3] and providing related testimony in the subject criminal action. A copy of the complaint is enclosed with this letter.

Pursuant to Article 38.01 §4 of the Code of Criminal Procedure, the Commission shall investigate allegations of professional negligence or professional misconduct that would substantially affect the integrity of a forensic analysis conducted by a crime laboratory[4] and issue a written report on its findings.[5] Complaint investigations are coordinated by a panel of Commissioners. Investigations ultimately result in the preparation and publication of a written

[1] "Professional Negligence" means the forensic analyst or crime laboratory, through a material act or omission, negligently failed to follow the standard of practice that an ordinary forensic analyst or crime laboratory would have followed, and the and the negligent at or omission would substantially affect the integrity of the results of a forensic analysis. An act or omission was negligent if the forensic analyst or crime laboratory should have been but was not aware of an accepted standard of practice.

[2] "Professional misconduct" means the forensic analyst or crime laboratory, through a material act or omission, deliberately failed to follow the standard of practice that an ordinary forensic analyst or crime laboratory would have followed, and the deliberate act or omission would substantially affect the integrity of the results of a forensic analysis. An act or omission was deliberate if the forensic analyst or crime laboratory was aware of and consciously disregarded an accepted standard of practice.

[3] "Forensic analysis" means a medical, chemical, toxicologic, ballistic, or other expert examination or test performed on physical evidence, including DNA evidence, for the purpose of determining the connection of the evidence to a criminal action, except that the term does not include the portion of an autopsy conducted by a medical examiner or other forensic pathologist who is a licensed physician.

[4] "Crime laboratory" includes a public or private laboratory or other entity that conducts a forensic analysis subject to this article.

[5] Tex. Code Crim. Proc. art 38.01 § 4(a)(3); *Id*. at § 4(b).

report that must be approved by the full Commission.[6] Commissioners Michael Coble, Ph.D., Bruce Budowle, Ph.D., and Mark Daniel, Esq. are the members appointed to the investigative panel. Commission investigations may include collection and review of documents, case records, review by subject matter experts, interviews with individuals involved in the incident and other action as appropriate.[7]

Commission staff will contact you in the coming weeks to establish a mutually convenient time for an interview with the panel. The Commission strongly encourages your input, and you are welcome to submit written materials and suggest individuals who are familiar with key issues in the complaint for interview by the panel.

The Commission's investigative process may take several months to complete. A final written report will be published on the Commission's website at www.fsc.texas.gov after conclusion of the investigation. The Commission will, within ten (10) business days of the issuance of any final investigative report, provide a copy of the report to any person or party that is the subject of the investigation.[8] Investigative reports by the Commission that include adverse action against you may be appealed by submitting a Notice of Investigative Appeal form to the Commission office within thirty (30) days of the date you receive a copy of the final investigative report.[9] A copy of the form will be included with your copy of any final investigative report. Final investigative reports by the Commission that concern an individual not licensed by the Commission are governed by Chapter 2001 of the Government Code and the State Office of Administrative Hearings.[10]

If you have any questions regarding the process or to submit materials you believe will assist the Commission in evaluating the complaint, you may reach me directly at (512) 936-0661 or via email at leigh.tomlin@fsc.texas.gov.

Sincerely,

Leigh M. Tomlin

Leigh M. Tomlin
Associate General Counsel

encl.

[6] 37 Tex. Admin. Code § 651.304 (2019).
[7] *Id.* at § 651.307 (2020).
[8] 37 Tex. Admin. Code § 651.309(a)(1) (2020).
[9] 37 Tex. Admin. Code § 651.309(a)(3) (2020).
[10] 37 Tex. Admin. Code § 651.309(a)(4) (2020).

EXHIBIT C

TEXAS FORENSIC
SCIENCE COMMISSION
Justice Through Science
1700 North Congress Ave., Suite 445
Austin, Texas 78701

August 11, 2021

Via e-mail to hotdoc2255@gmail.com

Melba Ketchum, Ph.D.
646 Harris Ridge Drive
Arlington, Texas 76002

Re: Texas Forensic Science Commission Complaint No. 21.32; Harris County Public Defender's Office on behalf of defendant Theodore Schmidt

Dear Dr. Ketchum:

Pursuant to its investigation in the matter referenced above, the Commission requests the following information:

1. A copy of the case folder for the referenced complaint;

2. Hard copy and electronic file of mitochondrial sequencing data from the hypervariable regions (HV1 and/or HV2) utilized at the time of the forensic analysis in the case; and

3. Hard copy and electronic file of any other data accessed for comparison at the time of the forensic analysis (*e.g.*, the underlying data in your database and the data against which you compared those data as discussed by you during your testimony).

If you have any questions regarding this request, you may reach me directly at (512) 936-0661 or via email at leigh.tomlin@fsc.texas.gov.

Sincerely,

Leigh M. Tomlin

Leigh M. Tomlin
Associate General Counsel

EXHIBIT D

REPORTER'S RECORD
VOLUME 10 OF 16 VOLUMES
TRIAL COURT CAUSE NO. 1204964
COURT OF APPEALS CAUSE NO. 14-10-00713-CR

THEODORE CHARLES SCHMIDT APPELLANT	) IN THE DISTRICT COURT
vs.	) HARRIS COUNTY, TEXAS
STATE OF TEXAS APPELLEE	) 182ND JUDICIAL DISTRICT

TRIAL ON MERITS

On the 19th day of July, 2010, the following proceedings came on to be held in the above-titled and numbered cause before the Honorable Mike Wilkinson, Judge Presiding, held in Houston, Harris County, Texas.

Proceedings reported by computerized stenotype machine.

Roxanne Wiltshire
Official Court Reporter
182nd District Court

APPEARANCES

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Attorneys for Defense

Okay. We're outside the presence of the jury. Proceed, please.

MR. WINDHAM: Have you been sworn, Dr. Ketcham?

THE WITNESS: Yes, sir.

MR. WINDHAM: Okay. May I proceed?

THE COURT: You're going to have to keep your voice up. I'm not sure that microphone is working very much.

MR. WINDHAM: May I proceed, your Honor?

THE COURT: Please.

MELBA KETCHAM,

having been first duly sworn, testified as follows:

DIRECT EXAMINATION

Q. *(BY MR. WINDHAM)* Dr. Ketcham, would please state your name for the record?

A. Dr. Melba S. Ketcham.

Q. And tell us how you're employed.

A. I'm the directer of DNA Diagnostics in Timpson, Texas.

Q. Okay. And what is that? What is -- do you own that business?

A. It's a corporation. I'm the president.

Q. All right. What does DNA Diagnostics do?

A. We do genetic testing.

Q. Okay. Is that for human genetic testing or non-human?

A. We do both.

Q. Okay. And, Doctor, how long have you worked for this corporation, DNA Diagnostics?

A. We incorporated, I believe, in '92; and I founded the lab in 1985.

Q. When you founded the lab, what was it known as at that time?

A. Shelterwood Laboratories.

THE COURT: I'm sorry. Say it again.

THE WITNESS: Shelterwood Laboratories.

Q. *(BY MR. WINDHAM)* All right. And, so, but now it's called DNA Diagnostics DBA Shelterwood Laboratories, correct?

A. That's correct.

Q. Okay. Now, again, what services does the lab provide?

A. We do a variety of DNA testing services including forensics, paternities. We do parentage verification in animals. We do animal disease diagnostics. We do array testing. In fact, we're the first laboratory in the world to offer animal

array testing, which we're also developing for forensics. We have also done research on human forensics and have a peer reviewed paper out on human forensics using the array technology, also.

Q. All right. Well, what I want to talk with you about specifically this afternoon is non-human DNA, animal DNA. Your lab provides services in that area, correct?

A. Yes, sir. That's our primary thrust.

Q. Okay. Now, Doctor, what I'd like for you to do is tell the Judge about your educational background, schools you've attended, degrees you've earned, what formal education you've had in the study of animal DNA. DNA, period. Just DNA in general, and then that specific to animal DNA.

A. I'm a Texas A & M graduate, the College of Veterinary Medicine, 1978. In 1985 we began the laboratory, and we were doing animal genetic testing. That was before DNA was particularly done in animals. In fact, I'm old enough that they didn't have a lot of DNA around whenever I was in college. So, I was a visiting scientist at the University of Kentucky in Lexington, Kentucky, to begin learning the genetic study. The DNA has been a learning process back in the early 90s when it came around both between me and

analysts that I've taught. Once you do genetic testing, the principles are all the same. So...

Q. Okay. Did your education and does your daily work in your lab include hands-on work with DNA testing techniques on a daily basis?

A. Yes, sir. I have the most experience. So, if it's forensics, I usually do that.

Q. Now, Doctor, what is the principal method of testing that you use when it comes to animal DNA testing?

A. Well, it's really the same as human. When we have adequate nuclear DNA, we do short tandem repeats or S.T.R.'s. Whenever we have no nuclear DNA or not enough to test, we use DNA sequencing on mitochondrial DNA.

Q. Is there a relevant scientific community that can be consulted in connection with the concept of animal DNA, Dr. Ketcham?

A. There's the International Society for Animal Genetics. However, they are just now trying to start up forensics. We, awhile back, tried to get an animal forensic society together. And there was not enough of us and there was a lack of interest.

Q. Okay.

A. So, not really.

Q. How many labs are there in this country that you're aware of that does pretty much animal DNA?

A. Could you clarify whether you're considering just forensics or if you're considering all animal DNA testing?

Q. No, forensics DNA testing, like what your lab does.

A. There are three others besides mine that I'm aware of.

Q. Okay. Are you a member of any professional organizations and societies that do work and research in connection with animal DNA?

A. Yes, International Society of Animal Genetics.

Q. Doctor, does the scientific community accept the P.C.R. technique as a capable and reliable method of testing non-human or animal DNA?

A. Yes, sir.

Q. Okay. So, we've heard a lot about P.C.R. in this trial. So, those techniques can apply to animals as well as to humans; is that correct?

A. Yes, sir. It's the same.

Q. Do all living things or living organisms like animals have DNA?

A. Yes, sir, they do.

Q. Okay. Okay. Have you published any articles in the area of your expertise?

A. Yes. There's a whole list in my C.V.

MR. WINDHAM: For the record, Judge, I provided a copy of her C.V. to counsel; and I've also provided a copy to the Court.

THE COURT: I've got it. Are you going to be marking something for admission or not?

MR. WINDHAM: Yes. I will mark a copy of her C.V. for purposes of this hearing and offer it into evidence. State's Exhibit...

THE COURT: Has it previously been marked?

MR. WINDHAM: It's 220, Judge. And, again, it's the same thing that I've tendered to the Court and tendered to counsel. So, I'll offer that, 220, Dr. Ketcham's C.V.

THE COURT: Objection, Mr. Lindeman?

MR. LINDEMAN: No objection, your Honor.

THE COURT: State's 220 is admitted.

Q. *(BY MR. WINDHAM)* What has been the experience of the scientific community with the use of P.C.R. testing to do -- for DNA in animals?

A. Well, it's a fairly long history. In the early 90s, it started becoming commonplace. It started out, first of all, as disease testing -- just simple P.C.R., R.F.L.P. tests -- and went from there to heritage verification for animal registries, which, of course, you know, keeps the people registering the animals honest, basically.

Q. Okay.

A. And then in 1995 is when it started coming more into the forensic community, and that's when we did our first case.

Q. Is that when you got into the forensics area of animal DNA, in 1995?

A. Yes, sir.

Q. And you've been doing that ever since?

A. Yes, sir.

Q. Doctor, have you -- so, the underlying scientific theory, the P.C.R. theory, is valid and reliable with respect to animal DNA testing; is that correct?

A. It's valid for all DNA testing.

Q. All right. And have you testified as an expert in the field of animal DNA before?

A. Yes, sir.

Q. Have you done that on few or many

occasions?

A. Quite a few occasions.

Q. Have you done that in the State courts here in Texas?

A. Yes, sir, I have, in Victoria County.

Q. What about other states?

A. Hawaii, Michigan, Montana.

Q. Okay. What about -- have you testified as an expert in this field of animal DNA in any of the Federal courts?

A. Yes. This most recent one was the last spring in Dallas.

Q. Okay. I want to talk about your -- you indicated that you've written a bunch of papers and done some research in the area of animal DNA?

A. *(Nods head.)*

Q. Has your work been peer reviewed?

A. Yes, it has. Some of it has, and some of it -- well, all of it has because even the abstracts have to be peer reviewed before they post them.

Q. And have you been involved in the peer review of other scientists in this field?

A. I'm listed as a peer reviewer with the Government.

Q. Okay. I want to talk to you about, you

know, your laboratory. Tell us about -- do you have certain protocols and controls set out in your laboratory?

A. Yes, sir, we do.

Q. Will you tell the Court what those are and how they are employed?

A. Basically, we use the same standards as any forensic laboratory would. We proficiency test. We run controls. We keep the records. It's the same, basically, as any human lab would do.

Q. Okay. And what about the proficiency? Do you do any -- do you go to classes or courses? Are there people that come in?

A. No, sir. With proficiency, we have to do human because there's no accredited animal suppliers of proficiency tests. But we do the human proficiency test, and it's basically the same as the animal. It's just a different organism. You use different markers, but it's the same test.

Q. Okay. Did you have occasion to be asked to look at some evidence in this case?

A. Yes, sir, I did.

Q. And what was the evidence that you were asked to look at?

A. It was a variety of items submitted from

tape lifts to the victim's clothing to the suspect's clothing.

Q. Okay. And when those items arrived at your laboratory, what do y'all do to make sure that they're secure and --

A. We have a --

THE COURT: Just a moment. I'm not sure if this is where we're headed. You wanted to hear about her expertise. This may be something we need before a jury instead of continuing on.

MR. WINDHAM: Okay.

THE COURT: Is that what you were after?

MR. LINDEMAN: Yes, sir.

THE COURT: Did you wish to take her now?

MR. LINDEMAN: Yes, your Honor, I would.

CROSS-EXAMINATION

Q. *(BY MR. LINDEMAN)* Ms. Ketcham, you testified that you graduated from Texas A&M University in 1978, correct?

A. That's correct.

Q. Did you have any other formal enrollment in any institution of higher education after that?

A. Not formal, as anybody else my age would have.

Q. Okay. So, you received a Doctor of Veterinary Medicine?

A. That's correct.

Q. The Certificate of Training at the National Veterinary Disease Laboratory in Ames, Iowa, in 1985 --

A. Yes.

Q. -- I assume from that date that it didn't include any training relative to canine DNA?

A. No. It was equine disease diagnostics.

Q. And your work as a visiting scientist at University of Kentucky '85 and '87, likewise, I assume was too early to include any teaching or study of canine DNA?

A. It was genetic based, but it was blood typing because at that time serology is what was being done.

Q. Okay. Blood of animals, though?

A. Yes.

Q. Okay. But not the DNA as it relates to hair?

A. No. That was way later.

Q. And the F.D.L.E. DNA advanced P.C.R.

training in '95, that again didn't relate to canine?

A. No, it related to human, which is the same as canine.

Q. Okay. And the Promega Statistical Genetics -- did I pronounce that correctly?

A. Go ahead. That's close enough.

Q. In 1996 and 1997, again that didn't include DNA testing of canine fur or hair?

A. No. Promega is human.

Q. Okay. And the same for the training in 1998?

A. Yes, because there's very little forensic training available in animals.

Q. Okay. And again, the training workshop in 1999 again didn't involve the training for DNA study of dog fur?

A. I presented animal stuff at the Promega meetings, you'll see in my C.V., because there at that time was little to none being done.

Q. Okay. So, if there was little to none being done, those early reports of yours were not peer reviewed, I guess?

A. Yes, they were, because Promega does not publish in their proceedings unless they review them.

Q. Well, let's go on. We've gone through '99.

Your workshop that you listed in 2002, I assume that also didn't include study of --

A. Which workshop are you referring to?

Q. Statistical Mixture Analysis Workshop.

A. That was human. Anything Promega that's a workshop is human.

Q. Okay. And GeneCodes Forensic Analysis Software training --

A. That was not exactly software training. That was where I was asked to perform DNA sequence analysis on the World Trade Center victims. We had 22,000 samples to go through.

Q. Okay. So, we've now covered the portion of your C.V. that deals with education, correct?

A. I don't have it in front of me.

MR. LINDEMAN: May I approach the witness, your Honor?

THE COURT: You may.

Q. *(BY MR. LINDEMAN)* Through 2003 there's nothing else listed on your C.V. related to education, correct?

A. That's correct.

Q. Okay. So, it's fair to say that your veterinary training in '78 that concluded in '78 at Texas A&M University didn't include training as to

that which you would testify to today, correct?

A. Oh, no. Not in 1978, no.

Q. Sure. So, then none of your formal education relates to this field of either mitochondrial or P.C.R. DNA testing for dogs?

A. No, sir.

Q. Okay. In your professional societies that you've listed, since there's nothing listed above in the education that relates to those, I assume you haven't gone to any special educational programs sponsored by the International Society of Animal Genetics?

A. Well, they have the meetings which, like I say, are behind what we're doing at this point.

Q. Well, I understand that many organizations have annual meetings. I'm talking about specific classes to enroll in to take over a period of time.

A. I was chair over the Horse Committee and the Dog Gene Map Committee at ISAG for years; and that meant that I was the one, basically, leading the way, teaching the way to the other laboratories worldwide.

Q. Okay. So, you're referring to the reverse. You're talking about being a teacher. I was talking about being a student. You'll agree with me that in

none of your professional societies have you served in a role as a student?

A. Well, I take continuing education. It's usually human DNA because there's not animal DNA offered really. It's just not that much of it done yet to have its own organization and to have its own teachers out there, unless you're just doing it yourself. And there's so few of us. So, the best thing is to use the human continuing education, to do it like a human test. Because DNA works the same way in mammalian cells. The only thing that's different is just the markers.

Q. What do you hold as the preeminent publication that the field of animal DNA looks to? Is there a preeminent publication?

A. I wouldn't say there's a preeminent one. There's several publications out there on various subjects that various people have put together, including myself; but there's not, like, a preeminent one that you would look for because there's so many varieties of testing. There's various species. There's, you know, so many things involved that nothing is, quote, "the go-to," I guess you would say, as far as a single paper.

Q. Okay. And by publication -- I mean, I said

it as clear as I could have -- but what I mean is: Is there a periodical, such as a monthly publication, in the field?

A. Not for forensics. Only for just regular animal genetics which has precious little to do with how a forensic case is done.

Q. Okay. So, I guess you've repeated several times that the field is still a fledgling field; is that fair to say?

A. I wouldn't say "fledgling." I would say -- because it's been around since '95. In fact, actually, we did a deer case in '93. I think that was actually our first one -- I had forgotten about that one -- for Parks and Wildlife. But it's just that there's not very many cases where there's evidence that has animal hair and what have you. They're beginning to grow. But a lot of times they're discarded or not tested; and therefore, there's very few of us that actually do this. And where there's few, it's hard to have a whole society. I mean, we tried. I was the president of one. We started it. We had 12 people interested. That was it. I mean, nobody wanted to do it. And Bruce Budowle of the F.B.I., he and I were discussing that there needed to be, you know, stricter controls; and

we authored a paper with suggestions for animal labs, which nobody's following.

Q. Is there a certification?

A. No, there's not.

Q. No certification in this area?

A. No, not in this area. There can't be because there's no -- even a legitimate provider of animal test DNA. That's why you can't really get certified. You're required a proficiency test, but you have to have -- you have to use a documented approved provider for your proficiencies, and the only thing you can get is human that is that way. You can't get the animal out there. Plus there's the problem with multiple species on top of it because --

Q. Problem with what?

A. With multi-species. Because, I mean, we've done forensic cases cat, dog, horse, you know, I mean, cow.

Q. But as it just relates to canine, there is no national organization in place relative to the study of DNA for canine?

A. It's not an organization. It's like C.T.S., Certified Testing Services. They are approved to send out proficiency tests. They don't do dog proficiency.

Q. Well, you said there's no certification.

A. They -- okay. In order for your proficiency to count, it has to come from a certified provider; and C.T.S. is not a certified provider of canine samples.

Q. So, therefore, there is no certification?

A. Right. It can't be because that's one of the benchmarks of doing forensics is having a proficiency.

MR. LINDEMAN: I pass the witness, your Honor.

MR. WINDHAM: Can I ask a couple more questions, Judge?

THE COURT: Okay. A couple.

REDIRECT EXAMINATION

Q. (BY MR. WINDHAM) Okay. So, there's no -- you're familiar with ASCLD?

A. Absolutely.

Q. The American Society of Crime Lab Directors. There's no ASCLD for animal laboratories in this country?

A. No. That's what we tried to establish, and there was no interest hardly.

Q. But, you know, in all these cases that you've talked about that you've done, have you used a

P.C.R. technique in doing the DNA testing?

A. Yes, sir.

Q. Okay. And although you mentioned there's no organization like ASCLD, when I was doing -- I notice there are a lot of articles out there. There are a lot of people out there doing research in the area of canine -- specifically canine DNA. Is it true that there are a lot of scientists out there that are doing work in this area?

A. Oh, absolutely. As far as just general genetic work, I mean, there's a whole workshop that I'm planning on attending in September, dog and cat genome workshops, where there will be all types of techniques and interesting things having to do with the canine genome. In fact, the array technology that we've developed is actually going to be one that's going to help forensics because -- and we used it on our first case. It's not come yet, but it's been used. That not only will it give you the dog's color but it will give you disease traits and it will give you identity at the same time, all in one test.

Q. Okay. Just a couple more things I want to ask you about. You mentioned that in animal DNA testing the P.C.R. technique works the same as in human testing.

A. Yes.

Q. The only thing different is the marker. Would you explain what you mean by -- what are the markers? How are the markers different?

A. Okay. Basically, your P.C.R. is just a cycling of temperature that amplifies the DNA that you want to look at in your test. Now, obviously, canine chromosomes differ from human chromosomes; and when you select a particular marker or a place -- or a locus is the name in genetics, which means the spot you're looking at basically -- you have what's called "primers" that you put on either end of the double helix. You put one on the forward end and one on the reverse end, and what that does -- it's like a bookmark. Whenever the DNA is cleaved open with the denature step of the P.C.R., your little primers go and they attach. When the temperature starts to cool, they attach at either end of the DNA locus that you're looking at.

Q. Okay.

A. And that allows for the loose nucleic acid you put in your master mix to fill in, giving you two ladders instead of one. So, each time you run a cycle on your P.C.R., it doubles the amount of your DNA. And with that in mind, you just have different

places in animals you look at that are informative versus the ones in humans.

Q. Now, we've heard about basically 13 areas in humans. You know the 13 areas we look for DNA --

THE COURT: You know, I think we're past what you need for this Daubert Hearing.

MR. WINDHAM: All right.

MR. LINDEMAN: Your Honor, we reurge our objection in Daubert in that there has not be been sufficient evidence to show that is this a scientifically accepted procedure that has case studies, peer review, and historical references to be reliable for the jury to determine any fact in this case. As well, we also object to this witness being accepted as an expert in that there's no evidence that she has obtained any special training to prepare her to testify to any science that may be related to animal DNA.

THE COURT: I find that the proposed testimony does qualify under Daubert. I'm going to recognize this witness as an expert in the field. I am going to allow P.C.R. test results of canine DNA, basically admitting expert testimony regarding canine DNA evidence. And I find that the DNA evidence can be both probative and admissible in this case. The

expert testimony and any evidence regarding consistency of the dog, Tony's, DNA taken from buccal swabs and known hairs from the dog, Tony, and the canine hair samples which are allegedly taken from both the complainant's clothing and the samples that were recovered from the defendant's clothing may be offered.

Anything else y'all need before we bring the jury back?

MR. WINDHAM: No, your Honor.

MR. LINDEMAN: Your Honor, at this time we'll offer our objection to the chain of custody on the several items.

THE COURT: Why don't you take a real short break, and we will take this up.

(Witness excused.)

THE COURT: I'm sorry? What are you objecting to? The chain of custody as to what? Which exhibits? If you'd give me numbers, that would help me.

Are you going be talking about numbers that we have not discussed yet?

MR. LINDEMAN: No, your Honor. Well, perhaps not in the last 30 minutes, but --

THE COURT: Where are we?

MR. LINDEMAN: 105, which is in evidence which is --

THE COURT: 105 is in evidence. That's correct.

MR. LINDEMAN: And I don't believe that there has been sufficient chain of custody for this witness to testify that it came into her possession.

THE COURT: Well, I don't know yet how it came into her possession. I don't think she's -- we haven't heard that information, have we?

MR. WINDHAM: We heard it from --

THE COURT: Well, we heard from those other people. We haven't heard from this witness, of course.

MR. WINDHAM: Correct.

THE COURT: Was that Hokett testifying as to that, or was there somebody else involved? I can't remember right now.

MR. WINDHAM: Judge, Deputy Hokett testified that he --

MR. LINDEMAN: I found it in my notes. I'm sorry. Hokett did testify he took it to Ketcham.

THE COURT: Right.

MR. LINDEMAN: Otherwise, our

objection rests with the inclusive testimony of Elois who testified that as to Item 62 and 63, he had no independent recollection of ever transporting that or any of the other property in this case. And at one time he testified that he took it to the M.E.'s Office on a specific date. Later he testified that he took it to the D.P.S. office on a different date. And since that's within the chain of custody of the collection of hairs off of...

THE COURT: Are we talking about D.P.S. within M.E.?

MR. LINDEMAN: No.

THE COURT: Some of the people who were there?

MR. LINDEMAN: No. A separate location.

THE COURT: Do you wish to address that, Mr. Windham?

MR. WINDHAM: Judge, I believe we have -- the only link left is for this lady to testify that she received it, what she did with it, and she returned it to Deputy Hokett, who testified that he took it to her and got it back from her and returned it to the Harris County Property Room. And I would think any other objections they have would go

to the weight not admissibility of the evidence, unless there's some allegation of tampering with the evidence, which I haven't heard.

THE COURT: Now, Elois, as I recall, had nothing to do with 105 and 106 or 103 through 106, correct? You're talking about Elois only with reference to transporting any canine hair that may have been retrieved from certain clothing?

MR. WINDHAM: Yes, Judge. You're right. 103 through 106 is Deputy Hokett.

THE COURT: We're still on the same topic. Your objection is overruled.

Let's get the jury, please.

(Jury enters courtroom)

THE COURT: Please be seated. This witness has been previously called. She remains sworn.

Proceed please, sir.

DIRECT EXAMINATION

Q. (BY MR. WINDHAM) Good afternoon, Dr. Ketcham.

A. Good afternoon.

Q. Dr. Ketcham, would you make sure you pull that mic up to you or move up to it so everybody can hear you? I want to ask you to look to your right

and introduce yourself to the ladies and gentlemen of our jury.

A. My name's Dr. Melba S. Ketcham. I'm from DNA Diagnostic Laboratory in Carthage, Texas -- or Timpson, Texas. I'm sorry. We were in Carthage, Texas.

Q. Doctor, where is Timpson, Texas?

A. It's northeast of Nacogdoches.

Q. Is that up Highway 59 North?

A. Yes, it is. We're right off 59, about two and a half blocks.

Q. Okay. The laboratory, DNA Diagnostics, are you -- do you own that business? Are you a shareholder? Would you tell us --

A. I'm the president of DNA Diagnostics.

Q. I'm sorry?

A. I'm the president of DNA Diagnostics.

Q. Okay. And is it a corporation?

A. Yes, it's a corporation.

Q. Okay. And how long have you worked at DNA Diagnostics?

A. Well, it originally was started as Shelterwood Laboratories back in 1985; and I was there then.

Q. Okay. And, so, you've been there since

1985?

A. That's correct.

Q. What services does your lab provide?

A. We do genetic testing services for both human and animal.

Q. And do you do mostly human or animal DNA testing?

A. We do more animal DNA testing.

Q. Okay. Would you tell the ladies and gentlemen of the jury about your educational background, schools that you've attended, degrees you've earned that prepared you to do DNA work at this laboratory?

A. I have a Doctorate in Veterinary Medicine from Texas A&M University. I was a visiting scientist at University of Kentucky. I have attended various workshops and continuing education over the years since that time.

Q. Okay. And do you -- in your daily work, are you working with basically hands-on work in the field of animal DNA testing?

A. There's not a test in my laboratory that I'm not proficient at running.

Q. Okay. And are these tests that are tests that are run with regards to animals?

A. Animal and human.

Q. Okay. Have you done DNA testing on canines?

A. Yes, I have.

Q. Okay. Doctor, have you testified previously as an expert witness in the area of animal DNA?

A. Yes, I have.

Q. Have you done that on few or many occasions?

A. Quite a few occasions.

Q. And have you done it all over the United States?

A. Yes, I have, even to Hawaii.

Q. Okay. And have you done it in any of our Federal courts?

A. Yes, I have. I had a case this spring in Dallas, Texas that was Federal court.

Q. Okay. Can you tell us -- does your lab have, I guess, a set of protocols and controls that y'all abide by in handling evidence that's brought in for testing?

A. Yes, we do. We use standards basically like ASCLD standards that would be used in human DNA testing.

Q. In other words, the same types of standards that any other lab use y'all have?

A. That's correct.

Q. Okay. And do all animals, like humans, have DNA?

A. Yes, absolutely, including plants.

Q. Okay. So, it's sort of --

A. Living creatures.

Q. It's the building block of animal life just like human life?

A. That's correct, from one-celled organisms up.

Q. Doctor, are you a member of any professional organizations or societies that, you know, do research or do work in the area of non-human and animal DNA?

A. We -- I'm a member of the International Society for Animal Genetics. Also, though, I am also a member of AFDAA which is a regional human DNA forensics organization; but we do present animal things, animal cases and research there, too.

Q. Have you done any research in the field of animal DNA?

A. Yes, sir, I have.

Q. Tell us about what types of research you've

done.

A. Well, it's been a variety of things. Our latest thrust has been a new array technology that I actually have patented that we're the only ones in the world doing. It's developing a profile. And I'm also developing this for human. I have a peer reviewed paper for human forensics on the same technology. And what it is is it puts a number of markers on a little slide; and it gives you not only just the genetic profile, which will identify the person or the animal, but it will give you your coloration of the animal. It will give you any diseases they have. It works the same in humans. It's a very good technology. And it gives you -- if you have an unknown dog or human, it will give you a little physical information along with -- and their disease status -- along with your identity.

Q. Is that the -- I notice in your curriculum vitae that you've mentioned something about VeriSNP.

A. VeriSNP is the trademark name for the array technology we've developed.

Q. Okay. And have you pattened that?

A. Yes, I have.

Q. You mentioned markers. Can you explain what you meant by that? Now -- well, before I go

there, let me back up a minute. Let me back up a minute. Are you familiar with the P.C.R.? I always mess up when I try to pronounce it. I believe it's polymerase chain reaction.

A. Very good.

Q. Short is P.C.R. Are you familiar with the P.C.R. method of extracting and testing DNA?

A. Well, P.C.R. is a little bit different than what you said. You extract the DNA first. Then you do the polymerase chain reaction, which basically just amplifies the little piece of DNA that you want to look at that will give you the information you need for your identity or whatever else you're looking for.

Q. Okay. Now, that's a technique that's used in human DNA testing; is that correct?

A. It's used in human and animal and plant, any type of DNA test, except some of the really newer technologies that are just now starting to come out. It's always P.C.R.

Q. Okay.

A. And all forensics are based at this point on P.C.R.

Q. So, P.C.R. is kind of the gold standard in molecular biology, I guess?

A. It has been for years, yes.

Q. Have you written any papers or, you know, made a bunch of speeches to organizations regarding animal DNA?

A. Yes, sir. There's a whole list of them in my C.V. there.

Q. Okay. And has your work been peer reviewed, and have you had the opportunity to peer review the work of other scientists in your area?

A. Yes. And any time you do anything from what's called an abstract, which is a short research paper, to a full article that goes in a journal that's peer reviewed, yes, I have done both.

Q. Okay. So, has the scientific community then accepted the P.C.R. technique as being capable -- a capable and reliable method of testing animal DNA?

A. Absolutely.

Q. Including dog DNA?

A. Absolutely.

Q. Okay. Can you use dog hairs or dog saliva as a source of dog DNA?

A. You can use a lot of sources to get DNA, anything from hair to saliva to blood to feces to urine. So, just anything that the animal will

basically touch, just like a human being, it can leave its DNA behind.

Q. Okay. All right. Well, Doctor, let me ask you this: Did you have occasion to receive some evidence to be looked at and tested for animal DNA in this case?

A. Yes, sir. Mr. Hokett brought the DNA evidence up for this case, and we signed a chain of custody receipt for it. It stayed at my laboratory for a period of time while we were testing it. And then Mr. Hokett came and picked it up and brought it back.

Q. Okay. And do you recall what it was that Deputy Hokett brought to your -- well, let me just --

MR. WINDHAM: May I approach the witness, Judge?

THE COURT: You may.

Q. (BY MR. WINDHAM) I want to show you some items. First of all, I want to show you what's been marked as State's Exhibit Number 62. I'll take it out of this bag. Okay? Do you recognize it?

A. This particular evidence did come to our laboratory.

Q. Okay. And is the part of the evidence that Deputy Hokett brought to you?

A. Yes. And it is listed on the chain of custody form.

Q. Okay. All right. And State's Exhibit Number -- this is 63. Recognize that also as part of the evidence that -- I'll show you the bag in which it was brought -- part of the evidence that Deputy Hokett brought you?

A. Yes, sir.

Q. Okay. Do you recognize what I'm showing you? This is State's Exhibit 62-A, 62-B, and 63-A. Do you recognize these?

A. No, sir. We did not use those.

Q. You didn't use them. All right. You used the tape lifts?

A. I used the tape lift and the victim's clothing.

Q. I got you. Okay.

A. Didn't use any slides.

Q. Okay. Let me show you what's -- these are admitted as State's Exhibits 104 and 105. And I'm going to show you 107 -- I'm sorry -- 108, 9, and 10. Can you look at that?

A. Yes. Those are --

Q. Do these look familiar to you?

A. Yes. Those are definitely things I used.

Q. Okay. And State's Exhibit 111?
A. Yes.
Q. Okay.
A. In fact, those are my markings on those.
Q. The markings that -- you pointed to to --
A. Yeah. I put a black mark for where I pulled some of the evidence from.
Q. Okay. When you say "pulled some of the evidence," did you pull hairs?
A. Yes, I did.
Q. Okay. And did you also have an occasion to review hairs from the other items that you identified, the shirt and the --
A. We used the tape lifts from the suspect, and we used the -- but we did pull hair directly from her clothing.
Q. Okay. Let me get some gloves. This box that I'm showing you here, State's Exhibit Number 151 and its contents which are, I believe, 151-A through E, if I recall correct, I'll pull them out. Do you recognize this box?
A. Yes, I do.
Q. Okay. Is this your initial?
A. Yes, it is.
Q. Okay. So, your initials are on the box,

correct?

A. Yes. When I sealed it back, I signed over it.

Q. All right. Inside State's 151 is State's Exhibit Number 151-F, the jacket. I'm sorry. We have State's Exhibit Number 151-B, a pair of shoes. State's Exhibit Number 151-E, some socks. A shirt, State's Exhibit Number 151-B. And a pair of pants, State's Exhibit Number 151-A. Do you recognize these items?

A. Yes, I do.

Q. They were in the box --

A. Yes, they were.

Q. -- that was delivered by Deputy Hokett?

A. Yes, they were.

Q. These are the items that you returned to Deputy Hokett after you did your testing?

A. Yes, they are.

MR. WINDHAM: Okay. I'm going to offer State's Exhibit 62 and 63 into evidence at this time. Tender them to Mr. Lindeman for his inspection again.

MR. LINDEMAN: Your Honor, as to 62 and 63, we renew our objection as it related to the matter heard outside the presence of the jury as

required by law and --

THE COURT: And what else?

MR. LINDEMAN: And we also object to the chain of custody not having been fully established as we've already previously argued.

THE COURT: It's overruled. State's Exhibit 62 and 63 are admitted.

MR. LINDEMAN: Your Honor, our objection is not so much to their admission. I think they're already in evidence, but any scientific tests --

THE COURT: Well, some of them are; and some weren't. Sixty-two and 63 were not. I believe those were the only ones that had not been.

MR. LINDEMAN: Okay. I understand.

Q. (BY MR. WINDHAM) Do you recall getting some animal hair from Deputy Hokett?

A. Yes, I do.

Q. Is this the animal hair?

A. Yes, it appears to be.

Q. I'm going to ask you this now: Would you explain to the ladies and gentlemen of the jury -- I want to talk about what you did, what type of testing you did with these pieces of evidence. And what I want to do is -- oh, one other thing. I forgot

something. State's Exhibit Number 103, which has been admitted into evidence. It's a buccal swab from Tony, the dog. And State's Exhibit Number 106 is a brush that was identified as Tony the dog's brush. Were those items brought to you also to be looked at?

A. Yes, they were.

Q. Okay. Let's talk about what you did with these items. Were you able to extract DNA from these items?

A. Yes, sir, I was.

Q. Can you tell the ladies and gentlemen of the jury how you went about doing that?

A. Well, we basically -- when you -- let's take, for example, a hair because evidence that I pulled was hair. You put it into a solution that will dissolve the hair and pull loose the sulfide bonds in the hair so that it releases the little DNA out of the cells. And when it does that, it's free then to undergo polymerase chain reaction, or P.C.R., or amplification. Meaning, whenever you take one little hair and put it in there, if you tried to run DNA on it, you couldn't get it because there's not enough there. So, what you do is you artificially manufacture DNA over and over by cycles of temperature and loose chemicals, nucleic acid and

what have you that fill in; and it makes enough DNA that you can actually visualize it with your eyes.

And that's the whole premise of polymerase chain reaction is to take that little bitty bit of DNA and make it enough that a human can actually see it. So, once you've broken the cells down to where the DNA floats loose, then it can go in with its chemicals and multiply to the point that you can visualize it.

Q. With regards to the hairs, how many hairs did you test?

A. I believe it was 14. I would have to check the report.

Q. Do you have it? Do you have your report?

A. *(No response.)*

Q. Doctor, let me ask you this: Do this -- instead of just a whole total --

A. Okay. That's what I was trying to total up --

Q. Okay.

A. -- because there were quite a few tests done.

Q. I figured that was what you were doing. Did you -- were you able to extract DNA from Tony's buccal swabs first?

A. Yes, I was.

Q. Okay. All right. So, now let's look at the next item, which would be the tape lift from the shirt, State's Exhibit 63, I believe that is. And it was listed as Item P when Deputy Hokett brought it to you, correct?

A. Yes.

Q. All right. Now, how many hairs were you able to get to test from this item?

A. We took two from the tape lifts from that item.

Q. Okay. And then from the other -- the black jacket, how many hairs did you look at from this item?

A. We took seven.

Q. Okay. All right. And then from the victim's clothing, how many hairs did you look at?

A. We took one from the right leg of the pants. We took four from the black shirt. One was taken from the left sock.

Q. Okay. Now, did you -- were you able to extract -- on each of these hairs from each of these items of clothing, were you able to extract DNA?

A. Yes.

Q. Okay. Were there any hairs that did not

yield enough DNA for you to do your testing?

A. Yes. There were two that did not.

Q. Okay. And from which item of clothing were those two?

A. Item N.

Q. And that would have been the black jacket, correct?

A. Yes.

Q. You said you had seven hairs from this jacket. So, I take it on five of them you were able to extract DNA; that is correct?

A. That's correct.

Q. All right. Now, this DNA extraction that you were doing, was it nuclear DNA or was it mitochondrial DNA?

A. It was mitochondrial DNA.

Q. What's the difference?

A. Nuclear DNA -- each cell has a central nucleus that contains your chromosome, and those are the ones that give you nuclear DNA. Now, in the cell itself, there's cytoplasm around the nucleus; and that's what feeds the nucleus and keeps the cell alive and gives it energy. Well, it has a little organism, called "organelles," floating in the cells. And one of them is called a "mitochondria," and it's

an energy producing organism, or a little organ in the cytoplasm itself; and it has approximately 16.5 kilobase, or 16,500 base fragment of DNA in that. Now, it's a -- being such a tiny piece of DNA, it's very useful whenever you have DNA that doesn't have enough nuclear DNA to test, you almost always have mitochondrial DNA because there's, like, a hundred mitochondria in each cell, up to a thousand in an ovum.

So, you have a hundred times as many copies of your DNA. And, therefore, it's easier to amplify and it's easier to get in degraded samples or samples like hair that's shed, hair that has no root material or tags of tissue on the roots that would have intact cells with nuclear DNA. The hair shaft itself has some residual mitochondrial DNA in it. So, it serves as a very good tool for samples like that.

Q. All right. And was that the type of DNA testing that you did on each of these items in each of the hairs from that mitochondrial DNA?

A. That's correct.

Q. Okay. Can you tell us what your findings were?

A. I found that, with the exception of the two

samples that did not amplify well enough to sequence, that we actually got -- all of the samples were consistent with one another. They had the identical DNA sequence from not only all the evidence samples that we took but also the control had an identical DNA sequence.

Q. And the control sample was which sample?

A. That was the Tony sample.

Q. Okay.

A. The buccal swab.

Q. So, as I understood you then, you said that the DNA that you got from the defendant's clothing, the suspect's clothes, and the DNA you got from the victim's clothes and the reference sample, Tony's DNA, are -- the profiles were all identical?

A. Yes, they were. The sequences were identical.

Q. Okay. Now, let me ask you this, Doctor: If I was a dog lover and, you know, played with my dog all the time and kept the dog in my house, would you expect that dog hair would get on my clothing?

A. Absolutely. I probably have some on me right now.

Q. And if I were to touch my cocounsel here, would you expect that some of that dog hair might

transfer from my clothing to her clothing?

A. Very probable.

Q. Okay. I want to show you what I've marked for identification purpose as -- I believe this is State's Exhibit Number 200. Does this pretty much sum it up what you just said?

A. Yes, sir.

Q. And would that assist the jury in understanding what you just said?

A. The only thing I would change is I would say DNA "sequences" were identical.

Q. Okay. That's my fault. I put the word "profile." I should have said "sequences." So, I'll change it.

A. Or you could say "haplotypes," either one.

Q. Haplotypes. The word "profile" to say "sequence." So, does that pretty much set it out, and would that assist the jury in understanding what you're saying?

A. That's correct.

MR. WINDHAM: I'll offer State's Exhibit Number 200. Tender to counsel for inspection.

MR. LINDEMAN: Your Honor, the defense has no objection.

THE COURT: State's 200 is admitted.

MR. WINDHAM: May I publish this to the jury?

THE COURT: You may.

Q. (BY MR. WINDHAM) Doctor, I apologize for using the wrong word there.

A. It's kind of semantic.

Q. Okay.

A. Profile usually refers to F.T.R.'s instead of mitochondrial DNA.

Q. Okay. Semantics.

MR. WINDHAM: I pass the witness.

CROSS-EXAMINATION

Q. (BY MR. LINDEMAN) Dr. Ketcham, I don't think we've met before. My name is Jim Lindeman. I represent Mr. Schmidt. You indicated that your lab is located in Timpson, Texas; is that correct?

A. That's correct.

Q. Okay. And you have provided us with a resume, so to speak. And we've had a chance to talk about this prior to the jury coming back in; is that correct?

A. Yes.

Q. And you'll agree with me that you graduated from Texas A&M University in 1978 with a Doctorate

Degree in Veterinary Medicine.

A. That's correct.

Q. And since that day, you've listed other workshops, other training. We've gone over those from '85 through 2003. And none of them involve any training in the field of animal DNA, correct?

A. Because there's none available.

Q. Okay. There's none available because it's a rather --

THE COURT: Hang on a second.

(Pause.)

THE COURT: All right. Proceed.

Q. *(BY MR. LINDEMAN)* Since we've had this brief interruption, you had -- your last listing in your resume showed your educational experience to be software training in 2003, correct?

A. It wasn't exactly software training. It was the World Trade Center. We analyzed all the victim samples from the World Trade Center -- 22,000 of them.

Q. Okay.

A. And I was one of the scientists that did that.

Q. Okay. But I'm reading: "Forensic Analysis Software training." That's what you wrote, correct?

A. That's how they labeled it, but we actually did the World Trade Center samples. That's exactly what we were doing -- 22,000 of them.

Q. All right. So, you'll agree with me that the field of animal DNA is a young science? Let's put it that way.

A. No, it's not young. It came -- it started back -- like I told you previously, back in 1995 we did our first case, per se, other than a Parks and Wildlife case in 1993, I believe --

MR. LINDEMAN: Objection. Nonresponsive, your Honor.

THE COURT: All right. If you can answer the question, please do it. And the State will be able to get you back on redirect.

Proceed, please.

Q. *(BY MR. LINDEMAN)* You'll agree with me that the traditional DNA study goes back decades, correct?

A. Yes.

Q. Probably back into the 1960s at least?

A. Oh, not what we're doing at all now. I would disagree with that.

Q. Okay. Let's skip to something else. You mentioned something about having a cutting edge program or DNA determination that can test

susceptibility to disease; is that what you testified to?

A. It's not susceptibility to disease. What it is is: It can test whether an animal carries a disease -- or a human for that matter, carries as a disease, a genetic disease. And it's done at the same time as the profile as well as you can have physical characteristics like color, eye color, hair color, and even in animals, coat length, how long haired they are.

Q. Well, Dr. Ketcham, what I want to talk about is, as you indicated and I wrote down -- I hope I got it right -- that this relating to humans is a science or a technology that you possess that nobody else in the field does?

A. No, I did not patent it in humans. We wrote a peer reviewed article for when we use this in humans to present it as an alternative to regular S.T.R. testing. Especially when a suspect has no physical description, you can get somewhat of that with this technology.

Q. Okay. So, you say it's already a science or a field that exists in human DNA study?

A. It is not valid in court yet for humans. It's just now under development. There's a number of

laboratories that are working, including ours, to bring this new technology into the forensic field because of the different things that you can do with it that you can't do with S.T.R.s.

Q. Okay. Well, let's talk about your specific laboratory, DNA Diagnostics doing business as Shelterwood Laboratories. Is that the correct name?

A. Yes.

Q. Okay. Now, told us previously that your lab is not accredited because there is no accreditation; is that accurate?

A. That's accurate in animals because there is no way you can -- there's certain rules you have to follow to be accredited and one of them is proficiency testing and there is no accredited provider of animal proficiency testing. So, no animal lab that does forensics in the entire world at this point is accredited that is either -- now, a Governmental is different. But as far as anybody that's doing criminal cases like our lab does, they are not accredited.

Q. Well, there's also no certification in that area; is that true?

A. There's no accreditation, certification, however you want to phrase it. There's not because

we still have no certified provider of animal DNA for a proficiency test like you do in human. So, we take the human one.

Q. And I asked you earlier if there was any preeminent publication, such as a periodical, in the field; and you said you know of none.

A. No. There's only -- there's not very many people that do animal forensics because the majority of forensic cases don't have animal DNA involved. Now, they're getting more prevalent as people are starting to learn they can use this technology. But at this time there's just a handful of labs worldwide that even do this.

Q. Okay. And, Dr. Ketcham, did you bring with you your file that would include the DNA evaluation you performed in this case?

A. It was not requested.

Q. So, you came to court to testify in a case; and I guess all you brought is your summary report?

A. Yes, of course.

Q. Okay. So, any testimony you might have to give as to markers or information about how you performed your test, you're not able to do that?

A. Of course I can do it. I did it. I know what I did, and I know what markers I used. And, so,

of course I can testify to it. But as far as the paper trail, it was not requested in discovery.

Q. So, your testimony would include then the actual number level for each marker for each item you tested? You can testify to that from memory?

A. You don't understand the type of testing we did because there's not, like, marker number per se. There's regions sequenced with mitochondrial DNA talking about S.T.R.s.

Q. So, because we're talking about mitochondrial DNA and not P.C.R., we're not dealing with a series of peaks that are measured and analyzed?

A. Not in the way you're referring to them. You're talking about -- the way you're presenting it, you're presenting S.T.R.s; and S.T.R.s and sequencing are two different things. Just like mitochondrial DNA and nuclear DNA are two different things. And both are P.C.R. based.

Q. All right. But to kind of jump ahead of us, your conclusion then is contained solely within your two-page report that was dated March the 1st of this year, correct?

A. That is correct.

Q. And you have that in front of you?

A. Yes, I do.

Q. Now, you'll agree with me that your field of science, as in any field of science, in order to be reliable has to be precise, correct?

A. Yes.

Q. Precise study, correct?

A. Study?

Q. Sure. Precise study of the items that were brought to you.

A. Oh, that. Yes. Of course.

Q. Precise conditions?

A. Yes.

Q. That is to avoid contamination?

A. Yes.

Q. And precise conclusions, correct?

A. Yes.

Q. I'm sure you could add more into that; but that's generally an outline of how they proceed, correct?

A. That's generally, yes.

Q. And what has been marked and presented to this jury as your conclusion then contained in State's Exhibit Number 200, you've made a correction to it, sequences, so it would be precise, correct?

A. Yes.

Q. Okay. And in all other respects, this is the precise finding that you made as it relates to the various items that were brought to you for analysis, correct?

A. That's correct.

Q. So, your report which has your finding in the last paragraph will be consistent with what's on that chart, correct? Because after all, we're dealing with what is precise, right?

A. Yes. Yes, sir.

Q. Okay. So, Dr. Ketcham, you'll agree with me that your conclusion in the last paragraph is that based upon the evaluation of all the hairs that you had before you, that the hair, or the hairs rather, all the samples could not be excluded?

A. That's correct.

Q. That's your wording?

A. Yes, except for the two that didn't run.

Q. Except for the two that were excluded from the jacket -- the seven that you had from the jacket?

A. Yes, two of them --

Q. Two of them didn't give you enough DNA. You only had five. So, all the hairs could not be excluded as being the same as Tony's?

A. That's correct.

Q. And that's the way you described it in your report, correct?

A. Yes.

Q. And your conclusion's contained within one paragraph, right?

A. Yes.

Q. This says "DNA sequences identical." You don't use the word identical anywhere in your report, do you? You want to take a minute to look?

A. When they're consistent with -- according to how the F.B.I. has you to evaluate sequence, if the sequence is identical, for mitochondrial DNA, is it consistent with --

MR. LINDEMAN: Objection. Nonresponsive, your Honor.

THE COURT: All right. He's looking for a "yes" or "no." And then explain it later.

Q. *(BY MR. LINDEMAN)* Again, is there anything in your report that uses the word "identical"?

A. No.

Q. Okay. And there's nothing in your report that quantifies your findings so anybody who looks at it can determine how you measured it? You'll agree with me the answer is "no," right?

A. Can you ask the question one more time?

Q. Let me rephrase it. You'll agree with me that there is no quantification -- that is, listing of numbers -- to show what the numbers showed, what the comparisons were, so that anybody could determine whether or not your conclusion was reasonable?

A. I did not enclose 700 bases of sequence, no.

Q. Just like you didn't bring the documents with you for anybody to evaluate, correct? You didn't bring the documents with you?

A. No.

MR. LINDEMAN: May I approach the witness, your Honor.

THE COURT: You may.

Q. *(BY MR. LINDEMAN)* By the way, you testified that State's Exhibit Number 106 was delivered to you; is that correct?

A. Yes, it was delivered.

Q. You'll agree with me that there's nothing in your report that mentions anything about having received --

A. We didn't use it.

Q. -- a dog brush?

THE COURT: I didn't hear it.

MR. LINDEMAN: Nonresponsive. I

object, your Honor.

THE COURT: All right. Ask the question again.

Q. (BY MR. LINDEMAN) There's nothing in your report to indicate that you received State's Exhibit Number 106?

A. That's correct.

Q. Okay. So, when Mr. Windham suggested that you received it, you agreed with him and said that you had received it?

A. Yes.

Q. And from your report, we can only conclude that all of the hairs had equal -- aside from the two that didn't produce enough DNA, we can only conclude that they all performed the same under analysis?

A. That is correct.

Q. Now, there are a couple of things that you mentioned, I want to make sure I took down correctly. You indicated that when you extracted the DNA item or items -- you extracted the DNA from the items, I should say -- that there was an artificially manufactured DNA? Is that what you said?

A. P.C.R. is an artificially manufactured DNA. It's a copy of the real DNA that came from the organism, and it's just repeatedly cycled through

temperatures to just build more and more of the same thing. It clones it. It makes it a large quantity of the same little piece of DNA you're looking at that came from the original organism that donated it. And it just keeps amplifying it with temperature variations, and loose nucleic acids fill in the holes.

So, you just double it every time it cycles and you run it for 25 to 35 cycles and you have a piece of DNA that you can attach fluorescents to and actually visualize with your eyes. When normally if you just had one or two copies or just a few copies, meaning nuclei that came from the organism, that those particular organisms would not give you enough -- you couldn't just attach fluorescents and see them because it's too little amount of DNA. You have to loosen the DNA from the cell, and then you have to amplify it over and over again to get enough so you can actually visually see it. And that's what P.C.R. is and it's used for human and animal and everything else in forensics.

Q. So, what you've described is a process that should make that circumstance of not enough DNA for testing obsolete?

A. No. That's not correct. Because you're

starting with whatever is submitted. You would not have any DNA in any forensic case; and for that matter, you wouldn't have any DNA testing period of any value in the entire world if you didn't have P.C.R. because, you know, one cellular copy or two cellular copies or a few things like that is just not enough DNA. You know, to get enough DNA to run it without this, you would have to take a big plug out of somebody, basically, and then get rid of all the protein, which would be a huge amount of work and you'd still have to attach the fluorescent label and that's done sometimes -- depending on the type of reaction you're doing, it's sometimes done during P.C.R. with these primers or these markers that delineate the little piece you're looking at, they have the fluorescents tagged to them.

So, really the bottom line is: Without your P.C.R. or your artificial recreation, cloning, of the same piece over and over to get enough of them to actually be able to see, you would not have any DNA testing. You would not have any DNA in forensics. You would never have any DNA to tell you if you're carrying an inherited disease. You would never have enough DNA to know if your paternity is correct.

Q. Thank you, Doctor. Doctor, would you agree with me that mitochondrial DNA is a testing of the paternal history of the dog?

A. That's correct.

Q. Okay. And when you did your evaluation of these dog hairs, did you conclude what type of animal or, that is, what breed of dog you were dealing with?

A. That is not what you do with mitochondrial DNA in dogs. To determine the breed in a dog is a whole different test. It's array based. It's patented by the Mars Corporation, and it's based on a bunch of nuclear snips where you use a large amount of DNA. It's similar to the array technology that I told you about that we developed.

And certain breeds have certain snips or markers that go in these arrays and they see what it has and then they go a percentage of this because this marker basically belongs to, say, doberman or this marker belongs to chihuahuas. And that's how they determine breed in dogs. They won't do it with mitochondrial DNA at all.

Q. Okay. So, you didn't do any test to determine the breed of any of the dog hairs that you tested?

A. No. And it's imprecise at best. So, it

would not be court-worthy.

Q. Okay. And you'll agree with me it's very difficult to do by any measure if the dog is what's referred to as a mutt or a mixed breed?

A. The mixed breed, the Mars test works in a fairly good manner. It's still imprecise. It's not an exact science when it comes to breed determination. But you get an idea of what, basically, the dog is made up of. It will say 80 percent, you know, chihuahua and 10 percent poodle and 5 percent Pomeranian or something like that. That's how the breed test actually goes. It's a completely different thing. Still amplified. Still P.C.R. based, just like all the arrays are at this point.

Q. Dr. Ketcham, you'll agree with me that nothing in your report or in your analysis showed any testing of the hair from the dog brush, State's Exhibit Number 106?

A. It was unnecessary to test the brush. We had controls --

MR. LINDEMAN: Objection. Nonresponsive, your Honor.

THE COURT: Sustained.

A. No, we did not test the brush.

MR. LINDEMAN: May we approach, your Honor?

THE COURT: You may.

(At the Bench)

MR. LINDEMAN: Your Honor, I have one matter that I think we need to take up outside the presence of the jury that relates to impeachment that out of an abundance of caution that I'd like to do before the Court before we do it in front of the jury of this witness. It relates to 404(b)-type of information.

(In the hearing of the jury.)

THE COURT: All right. Ladies and gentlemen, please go with the bailiff back to the jury room for a few minutes.

(Jury leaves courtroom)

THE COURT: Please be seated.

In regards to 404(b), basically in broad terms state, since we have the court reporter back, what you were thinking about. The jury's not here. We've got the court reporter.

MR. LINDEMAN: Your Honor, we were just going to put on the record an inquiry of this witness whether or not there is an Attorney General's Office investigation and parallel suit now pending

against her business related to accusations of fraud in the breeding business.

THE COURT: Say that. Fraud what? In the breedings business?

MR. LINDEMAN: Accusations of fraud in the receipt of funds but lack of performance as to analysis toward animal breeding.

THE COURT: And you think this somehow applies how?

MR. LINDEMAN: Well, this witness has testified over and over --

THE COURT: Okay. Under what theory would this come in?

MR. LINDEMAN: Impeachment. Just impeachment as to her claim of proficiency.

THE COURT: So, you're talking 404. This doesn't apply to 404. In case y'all bother to look up 404. It doesn't apply at all as to 404.

MR. LINDEMAN: Okay.

THE COURT: 404(b). It's not 404(b) at all.

MR. LINDEMAN: Okay.

THE COURT: You want to search a little bit more?

MR. LINDEMAN: No, your Honor. I

think we'll explore another area, if that's the Court's ruling.

THE COURT: Okay. Well, I'm telling you it's not 404(b). And if you try to shoot under any of the 600s, it's not going to be there either. And you don't have any -- I can't imagine as to character or as to conviction...

MR. LINDEMAN: Under Rule 700, impeachment of an expert.

THE COURT: Well, I don't see it. And it hasn't been proven up.

Anyway, you have a couple more questions in front of the jury with this witness?

MR. LINDEMAN: Yes.

THE COURT: And then it's my understanding you have the M.E. available and has to go on today and do it.

MR. WINDHAM: Yes, Judge.

THE COURT: Okay. Do we need to take this witness off for any reason? I mean, if you really only have a couple more questions...

MR. WINDHAM: Let's go on and finish her. I'd like to finish her.

THE COURT: Okay.

MR. LINDEMAN: Since I'm going to be

going into an area that's faster and I make sure that it's something I understood -- I think I understood Dr. Ketcham to say that she was accredited through the ASCLD when she testified? Or did I misunderstand that?

THE COURT: I don't remember that acronym.

THE WITNESS: Definitely. Nobody's ASCLD certified in animals.

MR. WINDHAM: That's not what she said.

MR. LINDEMAN: Okay.

THE COURT: So, do you still need to ask more questions of this witness?

MR. LINDEMAN: Yes, your Honor.

MR. WINDHAM: So, is his request for that improper impeachment overruled?

THE COURT: Yeah. We're not going there.

(Jury enters courtroom)

THE COURT: Proceed, please.

Be seated.

MR. LINDEMAN: May I proceed, your Honor?

THE COURT: Please.

Q. (BY MR. LINDEMAN) Dr. Ketcham, your business is known as DNA Diagnostics doing business as Shelterwood Laboratories; is that correct?

A. Yes.

Q. Okay. Now, you'll agree with me that DNA Diagnostics is a world renowned outfit out of Ohio, correct?

A. No. That's a different name.

Q. Well, I understand. It's a different outfit than yours.

A. It's a different name. It's DNA Diagnostics Center.

Q. Okay. So, they're DNA Diagnostics Center and you're just DNA Diagnostics doing business as Sherwood [sic] Laboratories, correct?

A. We're actually not even using the Shelterwood Laboratories anymore. We just haven't taken it off.

Q. Okay. So, you don't agree with me then that having the name of DNA Diagnostics is confusing and tends to associate you with another world renown outfit of which you're not associated?

A. We had the name first.

Q. Okay. How long have you had that name?

A. Since approximately, I think, 1989 or '90.

Q. So, therefore, you believe that that outfit of to Ohio, DNA Diagnostics, came along after that?

A. Yes.

MR. WINDHAM: Objection. That's not relevant.

THE COURT: Sustained.

Q. *(BY MR. LINDEMAN)* So, you talked about your lab and the work that you've done there. The evaluation that you did in this case, who reviewed your work that you did in this case?

A. I had another person to overlook it in the laboratory.

Q. Okay. And what is that person's name?

A. Hannah Wasiluk.

Q. I'm sorry?

A. Hannah Wasiluk.

Q. Spell the last name for me.

A. W-A-S-I-L-U-K.

Q. Okay. And she is an employee of yours?

A. She's not now. She was.

Q. Okay. And you indicated that in your evaluation of this case, there were how many thousand entries? Did you say -- how many thousands of entries did you say that you had related to this case?

A. I'm not understanding your question.

Q. Okay. What sort of quality controls do you have in your lab?

A. Oh, there's a lot of quality control.

Q. Do you have a self-contained air conditioning system?

A. We have a Laminar flow hood we use for that purpose.

Q. A what?

A. A laminor flow hood.

Q. Okay. And how does that perform for you?

A. What it does is it keeps any contaminants from in the forensic area from -- it makes a flow of air that keeps you from contaminating anything, basically, to put it very simply.

Q. How many rooms do you have for your analysis?

A. Ten, not counting my office space or anything else.

Q. Do you have any internal audits that you perform?

A. Do you mean I'm auditing -- we run controls. We run tests to make sure they're working that are already known. We audit all of our work that way.

Q. Okay. Specifically, what internal audits do you perform over your lab, not over any specific tests that you perform, but over your lab?

A. Well, we keep all of our M.S.D.S.U.s up together. That's one of the audits we have to complete. We do the -- as far as the whole lab, I walk through and inspect it and make sure that everything is working as it should, not just specifically but I go through and I check the dates. We have logs that we keep for Q.C. on instrumentation for the whole lab. I mean, there's -- I could go on for an hour talking about all the different quality controls we do.

Q. Okay. What sort of the external audits do you perform on your lab?

A. There's nobody locally that can externally audit an animal laboratory.

Q. Well, I'm not talking about just an animal laboratory. You indicate that you do human DNA testing as well, correct?

A. That's correct.

Q. Okay. So, to do human DNA testing, you should have an external audit; that is, an outside agency that comes in and audits your lab to make sure that you meet all the proper standards. Who is it

that does that?

A. I've had the -- not an official one because we're not accredited. ASCLD is not going to come in and audit us because we are not accredited because of the animal. I've had Dr. Boldin-Reeder has been in my lab, and she has looked my lab over. In fact, she is a consultant; and we are having her prepare to go ahead and come accredit it just on human with the hopes that it will help with the animal, also.

Q. Okay. So, you have no agency that has done any external audit of your business since you've formed your business?

A. You cannot do that unless you are doing accreditation, per se; and we're still not sure how to handle that because of the animal -- we have animal DNA in the building. I'm not sure -- we're not sure how that will even fly as far as the ASCLD people because they're all human. We're mixing things in there. We do mixed cases, and that confuses the issue.

Q. Well, Doctor --

A. At this point we can't be accredited.

Q. Dr. Ketcham, isn't it true that a lab can be accredited by an accreditor organization without specific area of expertise? Isn't that true of

research labs?

A. You have to be accredited in order to -- on forensic labs, they want you to be accredited. But there's rules you have to obey, and our lab falls in between those rules because of the animals that we test. And that's what we're trying to find a way around, but we have had other scientists in there to look at our faulty and...

Q. Okay. So, let's go back to your report. Is it your testimony that in order to form a conclusion as you did in this report, that there would have to be statistical measures to refer to when making these conclusions?

A. In this case you don't use statistics -- or I choose not to use statistics because there can be a small amount of variance depending on geography as well as breed of dog. And without a local specialized database -- I want my statistics to be absolutely not varying one percentage point either way or whatever. I want them to be correct. So, without using a database that is local to the animal and of the same type of animal, I don't give statistics.

Q. Okay. And again, as to the animal that you were testing in this case, you can't tell us whether

it was a beagle or a shepherd or what kind of animal?

A. As I've explained before, I mean, as a veterinarian, I can look at it and tell what it looks like as far as breed. However, the breed test is a snip based test patented by Mars. It is basically an approximation of what they think the makeup is due to markers, the little places we look at, that say, say, "90 percent of collies have this particular mark." So, this marker shows up in this dog. But, yet, a marker that's 90 percent of dogs that are beagles have another; but you still say they have a 10 percent error.

So, there's not, like, a hundred percent yes/no test. They give you an approximation. This dog should be approximately 50 percent beagle, you know, 20 percent collie, and 10 percent Samoan. They give you just an approximation. It's not a cut-and-dry test that I feel would serve as a forensic test. That's why we're developing the VeriSNP because it gives the colors and what have you.

Q. And you'll agree with me that there are only one or two labs in the whole United States that are doing this type of testing?

A. There's very few.

Q. One or two?
A. Three.
Q. So, it's not really a fully developed science?
A. It's a fully developed science, but there's so little of it to be done that not very many labs do it.
MR. LINDEMAN: May I approach the witness, your Honor.
THE COURT: You may.
Q. *(BY MR. LINDEMAN)* Dr. Ketcham, I'm showing you what's marked for identification as Defendant's Exhibit Number 37. Have you seen that document before?
A. Yes. It's my report.
Q. That's the report that you concluded in this case?
A. Yes.
Q. Is that a fair and accurate copy of your report?
A. It appears to be.
MR. LINDEMAN: At this time we offer Defendant's Exhibit Number 37, and we pass it to opposing counsel.
MR. WINDHAM: I have no objection to

it coming in, Judge.

THE COURT: Defendant's 37 is admitted.

Q. (BY MR. LINDEMAN) And again, your conclusion is: "Therefore the evidentiary samples tested cannot be excluded as being from the known dog, Tony." Correct?

A. That's correct.

MR. LINDEMAN: Pass the witness, your Honor.

MR. WINDHAM: No further questions, your Honor.

THE COURT: You may stand down.

Call your next, please.

MR. WINDHAM: May this witness be excused, your Honor?

THE COURT: Could y'all approach for a minute?

(At the Bench)

MR. LINDEMAN: I feel an education coming on.

THE COURT: No. Just step over here.

(Discussion at the Bench, off the record)

MR. WINDHAM: Judge, before the next witness comes in, I want to reoffer some exhibits because my notes reflect that these exhibits were offered and were accepted with a provision. Reoffering 103 through 111. Just reoffering those just to make sure.

THE COURT: Hold on. What?

MR. WINDHAM: 103 through 111.

THE COURT: It appears to me they're already in.

MR. WINDHAM: Okay. Well, thank you, Judge.

THE COURT: What does the defense have?

MR. LINDEMAN: We have them in, your Honor.

THE COURT: All right. If they haven't previously -- for some reason the record doesn't reflect it, State's Exhibits 103 through 111 are admitted.

MR. WINDHAM: Thank you.

MR. LINDEMAN: Just out of an abundance of caution, if there's any that relates to our previous objection, we'd have it again.

THE COURT: What other numbers do you

have? Do you have your master list handy?

MS. DEANGELO: Yes.

THE COURT: Come on up.

Mr. Lindeman, would you like to go through this list while we go through it?

MR. LINDEMAN: Yes, your Honor.

THE COURT: I'm going to go through my list of what is not in evidence. I think that's going to be the easier way to do it. I'm going to go through the numbers that I have that's not tendered and admitted.

Thirty-four.

MS. DEANGELO: No. That's in.

THE COURT: Huh?

MS. DEANGELO: That's admitted.

THE COURT: What says the rest of you?

MR. LINDEMAN: I show it admitted, too.

THE COURT: Okay. If y'all do, then it's in. Then I'm sure that I'm wrong. I know we talked about this recently. Sixty-two, 63, 63-A, 63-B.

MR. WINDHAM: A and B are not offered. All I'm offering is 62 and 63.

THE COURT: I'm just curious as to

whether or not they're in.

MR. WINDHAM: Yes, they are in.

THE COURT: Okay. What do you think, Mr. Lindeman?

MR. LINDEMAN: As to 62 and 63? We still have the same argument relative to the chain of custody in that it's an inconsistent account as to where the where the jacket and shirt went.

THE COURT: I had that note down here that I needed Elois.

MS. DEANGELO: It was admitted a couple hours ago, Judge.

THE COURT: I did admit. Okay. So, State's Exhibit 62 and 63 are admitted.

MR. WINDHAM: Yes.

MR. LINDEMAN: I agree with that as a matter of fact. As a matter of law, I have an objection.

THE COURT: But not 63-A and 63-B.

MR. LINDEMAN: Correct.

MR. WINDHAM: Right.

THE COURT: I do not have 97 in, correct?

MS. DEANGELO: No. That was admitted.

MR. WINDHAM: That was admitted.

MR. LINDEMAN: We have it in.

THE COURT: Ninety-seven?

MS. DEANGELO: Yes.

MR. LINDEMAN: Correct.

THE COURT: All right. State's Exhibit 97 is admitted, if it hasn't already been.

There's a whole series that's going to be coming in with this witness. So, I'll jump over those.

Starting with 148 --

MR. WINDHAM: That has not been offered yet.

THE COURT: Okay. 149.

MR. WINDHAM: 149 has not been offered.

THE COURT: Okay. Don't forget on 151 there's a tag attached.

MR. LINDEMAN: Correct.

THE COURT: Okay. On the one that begins on 198. I have 199-A and 199-B are admitted. No. Is it A and B or is it --

MS. DEANGELO: It was just 199 and 199-A.

THE COURT: 199 and 199-A. That's what I have. But not 200; is that correct?

MR. WINDHAM: 200 is admitted.

MR. LINDEMAN: 200 is in.

THE COURT: Okay. And then 201 and 202 I do not have.

MS. DEANGELO: No.

MR. WINDHAM: Have not been offered.

THE COURT: Okay. 208 and 210 are not in.

MR. WINDHAM: 208 and 210 were not admitted.

THE COURT: 211 is not in.

MS. DEANGELO: Correct.

THE COURT: Nor 212.

MS. DEANGELO: Correct.

THE COURT: I'm trying to read what I've got here for 213. I have a 213 and 213-A.

MS. DEANGELO: 213 is admitted, and A we abandoned.

MR. LINDEMAN: That's correct.

THE COURT: "A" is admitted. Thirteen is not there anymore.

MR. WINDHAM: Wait. No. 213 is --

THE COURT: 213-A is a copy of 213.

MR. LINDEMAN: Correct.

MR. WINDHAM: And I withdrew the

proffer of that copy and put in the original.

THE COURT: So, it's 213 that's in, not 213-A.

MR. WINDHAM: Correct.

THE COURT: All right. Was there a 214? I don't have anything.

MS. DEANGELO: Yes. It hasn't been offered yet.

THE COURT: Okay. You're not there. That's fine.

215, 215-A, I don't have them.

MR. LINDEMAN: They're photographs.

THE COURT: I know they are.

MS. DEANGELO: They weren't admitted.

THE COURT: Okay.

MR. WINDHAM: They haven't been admitted yet.

THE COURT: And 216 and 17 are not in at this time.

MR. WINDHAM: Not yet.

THE COURT: And 219 and 219-A.

MR. LINDEMAN: I don't show them in.

THE COURT: I believe that will concludes about all the State's exhibits.

(In the hearing of the jury)

EXHIBIT E

Subject: Re: Non-human DNA Accreditation FSC 21.32
Date: Thursday, September 16, 2021 at 10:21:41 AM Central Daylight Time
From: Sale, Pamela
To: Leigh Tomlin
CC: Lynn Garcia, Robert Smith, Kennedy, Melissa
Attachments: image001.png, image002.png

Hi Leigh.

I'm probably best equipped to answer your questions. I'm not the "oldest" ANAB (ASCLD/LAB) employee 😊, but I have been with the company longer than most.

I did listen to the last Commission meeting so I think I know the context for your questions. I'll give you the general background that I know.

ASCLD/LAB
Existing accreditations in 2010:

- accredited the TX Park & Wildlife Laboratory at least as far back as Sept. 2006 in Biology (non-human DNA) under the Legacy program
- accredited the National Fish & Wildlife Laboratory at least as far back as June 2007 in Biology (non-human DNA) under the Legacy program
- accredited the UC Davis Veterinary Genetic Laboratory at least as far back as July 2010 in Biology (DNA-Nuclear and DNA-Mitochondrial, both limited to test items from animals) under the International program

ASCLD/LAB only accredited laboratories that met the definition of "crime/forensic laboratory", which was "a laboratory (with at least one full-time scientist) which examines physical evidence in criminal matters and provides opinion testimony with respect to such physical evidence in a court of law."

ANAB and FQS
I'm not sure what either of these accrediting bodies did back in 2010 related to non-human DNA. I would be surprised if ANAB would have declined to offer accreditation for non-human DNA had an applicant lab inquired, as this would have been an opportunity to grow their forensic program. ANAB did not acquire FQS until 2011.

Let me know if you have specific questions and I will try to answer them. If you want to set up a call, that is fine too.

Pam

Pam Sale | ANAB
Vice President, Forensics
ANSI National Accreditation Board
Milwaukee | D.C. | Cary | Fort Wayne
Tel: 414.501.5361 | psale@anab.org
ANAB Forensic Accreditation - *www.anab.org*
ANAB Training - *www.anab.org/training*

signature_283828676

From: Leigh Tomlin <Leigh.Tomlin@fsc.texas.gov>
Date: Thursday, September 16, 2021 at 9:35 AM
To: "Kennedy, Melissa" <mkennedy@anab.org>
Cc: Lynn Garcia <Lynn.Garcia@fsc.texas.gov>, Robert Smith <Robert.Smith@fsc.texas.gov>, "Sale, Pamela" <psale@anab.org>
Subject: Re: Non-human DNA Accreditation FSC 21.32

Thank you, Melissa!

Leigh M. Tomlin
Texas Forensic Science Commission
(512) 936-0661

From: Kennedy, Melissa <mkennedy@anab.org>
Date: Thursday, September 16, 2021 at 9:27 AM
To: Leigh Tomlin <Leigh.Tomlin@fsc.texas.gov>
Cc: Lynn Garcia <Lynn.Garcia@fsc.texas.gov>, Robert Smith <Robert.Smith@fsc.texas.gov>, Sale, Pamela <psale@anab.org>
Subject: FW: Non-human DNA Accreditation FSC 21.32

Hello Leigh,

I've cc'd Pam on the email and I think she can give you the ASCLD/LAB history. Uncertain about ANAB legacy accreditation…

Melissa

Melissa Kennedy | ANAB
Director of Accreditation - Forensics
ANSI National Accreditation Board
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Desk: 414-501-5367 | mkennedy@anab.org
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Accreditation Related Training - www.anab.org/training

_____

From: Leigh Tomlin <Leigh.Tomlin@fsc.texas.gov>
Sent: Wednesday, September 15, 2021 11:19 AM
To: Kennedy, Melissa <mkennedy@anab.org>
Cc: Lynn Garcia <Lynn.Garcia@fsc.texas.gov>; Robert Smith <Robert.Smith@fsc.texas.gov>
Subject: RE: Non-human DNA Accreditation FSC 21.32

Hi, Melissa.

Hope all is well. We're working on a case involving non-human DNA analysis where the evidence and testimony were presented at a July 2010 trial. Do you know who can talk to that might be familiar with what options were available for non-human DNA accreditation at that time?

Thank you,

Leigh

Leigh M. Tomlin
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EXHIBIT F

Fwd: Reply to panel

Dr. Melba Ketchum <hotdoc2255@gmail.com>

Fri 7/16/2021 7:55 AM

To: Kathryn Adams <Kathryn.Adams@fsc.texas.gov>

1 attachments (121 KB)

resume_current_15_website-1.pdf;

---------- Forwarded message ---------
From: **Dr. Melba Ketchum** <hotdoc2255@gmail.com>
Date: Thu, Jul 15, 2021, 8:20 AM
Subject: Reply to panel
To: Kathryn Adams <Kathryn.Adams@fsc.texas.gov>

Kathryn,,

Please forward the statement and attachment below to the panel. Also, please confirm receipt. Thanks in advance.

Dear panel,

I swear the following to be true to the best of my recollection. I refute any and all claims in this complaint. First, I am and have been retired since the end of 2012. I no longer work in the field of forensic science. I have no plans to return to the discipline. When our lab was doing case work, we were on the cutting edge of forensic testing. We handled both human and animal mixed cases as well as animal cases. We coauthored a paper on human forensic testing using array technology. All testing for the paper below was performed in our laboratory.

Robert Pomeroy1, George Duncan2, Bulbin Reeder3, Elen Ortenberg4, Melba Ketchum5, Hannah Wasiluk5, and Dennis Reeder3, A Low Cost, High-Throughput, Automated SNP Assay for Forensic Human DNA Applications. Analytical Biochemistry. 2009 Jul 29. [Epub ahead of print]

I was an active member of AFDAA and was treasurer at one point as well as attended other forensic meetings and workshops. Please see my attached CV.

Prior to this case, we were told we couldn't become accredited by ASCLAD because there was no ASCLAD certified proficiency test provider for animal testing. At the time, we operated under ASCLAD guidelines and performed the human proficiency test from the ASCLAD certified provider, CTS, as a substitute as well as in house proficiency tests for analysts. I won't state all of the ASCLAD regulations we followed because I'm sure you are aware if them. I strongly agreed that accreditation was necessary after visiting a substandard lab previously on a case and coauthored the following peer reviewed paper:

Bruce Budowle1, Paolo Garofano2, Andreas Hellman3, Melba Ketchum4, Sree Kanthaswamy5, Walther Parsons6, Wim van Haeringen7, Steve Fain8, and Tom Broad9 , Recommendations for Animal DNA Forensic and Identity Testing. Int. J. Leg. Med. (2005)

At some point much later, after this paper published, I heard that the Fish and Wildlife Lab in Ashland, OR was providing an animal proficiency test. I was never told that they allegedly had already implemented a proficiency test, much less was invited to participate. Even though they were not officially listed as a certified provider, I immediately contacted them and asked to participate. I was informed that they would put me on the list and contact me when the test would ship. It was not as if they weren't aware of my lab since I had been an invited speaker at the Fish and Wildlife lab in 2004 on animal forensics and the need for proper procedures, including proficiency testing:

Invited Speaker, NWAFS (Northwest Association of Forensic Science) Meeting, October 2004, Ashland, Oregon.

I didn't receive notification after waiting several months so I called again and was told the test hadn't shipped yet, but I would be notified. It was very upsetting when some time later, I learned that the test shipped but we weren't included. That set our lab back, timing wise, in our quest for accreditation. The letter from UCD states that they received accreditation in July of 2010. If they had performed the testing in this criminal case instead of our lab, they would not have been accredited either at the time of testing! They didn't receive their accreditation until July of 2010, the same month the trial was held. Testing would have been completed well before the trial date so they would not have had their accreditation either.

As far as the lack of statistics provided in this case, there was a valid reason for it. We had established an in house mitochondrial DNA database for dogs using random unrelated dogs and dogs from the local animal shelter. When a database for dogs was published, our database varied statistically to the point I was very uncomfortable citing statistics. I spoke with the prosecution in this case, voicing my concerns that using the published database could be inaccurate for local dogs and suggested that he collect some local samples.. I told him the cost would be less than for the forensic samples but I felt it was necessary. He declined so I told him I would not cite statistics, less they be inaccurate for the Houston area. I felt it was always important to err on the side of caution in forensics.

Should the panel decide to send this for further investigation, I can provide witnesses in support of this statement.

I apologize for the lack of formal response, but I'm having to write this on my phone since my computer has to have it's data restored. The Texas storm destroyed my home. I waited until the last minute, hoping I would have my computer back.

Sincerely,
Dr. Melba S. Ketchum

EXHIBIT G

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Preliminary Report of DNA Testing Case Number: 09-26734/Harris County Sheriff's Office

The following samples were received from Harris County Sheriff's Office via personal delivery by M. Hockett for the purpose of DNA testing:

Item #1: Tapelifts from A4(black shirt) and A5 (white socks)and large plastic bag with DPS barcode 070605423 containing Item B: tapelifts from victim's body
Item #3: buccal swabs-Tony (pet dog)
Item #P(rg): Tapelifts from T shirt
Item #N(rg): Tapelifts from black jacket
Item #5: Box of victim's clothing

Methods:

DNA was extracted from all items using a standard Protease K extraction followed by a PCI/butanol wash with DNA concentration using Microcon™ Y100 columns. PCR was performed on the items using canine specific primers for HV1 and canine specific primers for HV2. Amplicons were visualized on agarose gels with Ethidium Bromide stain. The samples were then sequenced using BigDye™ Sequencing Kit by Applied Biosystems and were analyzed using an ABI 377 automated sequencer.

Testing:

From Item #P(rg), two hairs were extracted and labeled PL and PS. From Item #N (rg) 7 hairs were extracted and labeled N1 through N7. From the Item#5, box of victim's clothing, one hair was taken from the right leg of the pants and labeled RLP, four hairs were taken from the black shirt and labeled BS1-4, and one hair was taken from the left sock and labeled LS. From Item #1: Tapelifts from A4(black shirt) and A5 (white socks)and large plastic bag with DPS barcode 070605423 containing Item B: tapelifts from victim's body, two hairs were extracted from A4 and labeled VC1-2. Amplification was successful in all of the items and positive controls with the exception of Item #N(rg): Tapelifts from black jacket, N3 and N7 which failed to yield adequate DNA.

Item #3: buccal swabs-Tony (pet dog), the known reference sample was extracted as B-1 and yielded adequate DNA for sequencing.

Signed: 

Date: 3-1-10

Findings:

Mitochondrial sequencing results were as follows: The sequence from #P(rg), two hairs labeled PL and PS, from Item #N (rg) 7 hairs labeled N1-2 and N3-7, from Item#5, box of victim's clothing, labeled RLP, BS1-4, and LS, from Item #1: Tapelifts from A4(black shirt) and A5 (white socks)and large plastic bag with DPS barcode 070605423 containing Item B: tapelifts from victim's body, two hairs from A4 and labeled VC1-2 were consistent with Item #3: buccal swabs-Tony (pet dog), the known reference sample. Therefore, the evidentiary samples tested cannot be excluded as being from the known dog, Tony.

Signed:

Date: 3-1-10

Dr, Melba S. Ketchum
Director, DNA Diagnostics, Inc.