**POINTS AND AUTHORITIES IN OPPOSITION TO DEFENDANT’S MOTION TO EXCLUDE CANINE DNA**

**State of California**

**June 2002**

**STATEMENT OF FACTS**

 Evidence to be produced by the People at trial in the present case will include visual comparison of hairs retrieved in the investigation of the disappearance and death of DD. Hairs recovered by law enforcement include what were determined by visual comparison to be animal hairs from the following locations: clothing found on the defendant’s laundry room dryer top (item #6); dryer lint found in a trash bag inside the defendant’s garage (item #13); hall carpeting in the defendant’s motorhome (item #74); a comforter seized at Twin Peaks Cleaners (item #93); and a bathmat in the bathroom of the defendant’s motorhome (item #155).

 The above animal hairs were forwarded to Veterinary Genetics Lab…for nuclear canine DNA testing. Insufficient nuclear DNA was able to be extracted from those hairs due to the absence of sufficient root material. The DNA extracts were then forwarded to Dr. H, Senior Scientist at Q Forensics. Dr. H performed mitochondrial DNA (“MtDNA”) testing on those extracts and obtained DNA types from item numbers 13, 74, 93, and 155.

MtDNA testing was then performed by Dr. H on known samples previously obtained by law enforcement from “L” a dog owned by the VD family. Comparison of those results revealed that the above evidence sample MtDNA sequences are consistent with those of L. The sequences shared by the evidence samples and L are found 23 times in a database of 357 randomly selected dogs of numerous different breeds maintained by Dr. H. Thus, the common sequences occur in approximately 1 in 15.5 dog in that database.

**ARGUMENT**

**I**

**CANINE MtDNA TYPING REULTS SHOULD**

**BE ADMITTED BY THIS COURT**

 This court should permit admission of canine mitochondrial DNA typing results produced in the instant case. Mitchondrial DNA testing is generally accepted in the scientific community as an accurate and reliable forensic testing method.

A brief examination of relevant standards governing the admission of scientific evidence is instructive. The admissibility of testimony presented by experts in the state of California based upon the use of new or novel scientific techniques is governed by the rules set forth in *Frye v. United States* (D.C.Cir. 1923) 293 F. 1013, and *People v. Kelly* (1976) 17 Cal.3d 24. Specifically, the "*Kelly-Frye*" rule in this state requires the proponent of such evidence to establish, prior to admission, the **reliability** of the scientific method employed. (*People v. Kelly*, *supra*, at p. 30; see also *People v. Leahy* (1994) 8 Cal.4th 587, 604.)

 **Reliability** for purposes of compliance with *Frye* has been interpreted by the California Supreme Court to mean the technique used "must be sufficiently established to have gained general acceptance in the particular field in which it belongs." (*People v. Kelly*, *supra*, at p. 30.) The *Kelly* court based its conclusion on the discussion in *Frye,*which noted,

 ". . . while courts will go a long way in admitting expert testimony deduced from a well-recognized scientific principle or discovery, the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs." (*Frye v. United States*, *supra*, at p. 1014.)

 The *Kelly* court added an additional inquiry in its 1976 decision, requiring the proponent to demonstrate that "correct scientific procedures" were used in the testing conducted in the particular case. (*People v. Kelly*, *supra*, at p. 30; see Argument II, *infra*.)

 California law approving the admissibility of forensic DNA typing evidence has specifically established that the testimony of a single, qualified witness – even one employed by the laboratory which conducted the testing at issue – is sufficient to establish general acceptance. The court of appeal in *People v. Allen* (1999) 72 Cal.App.4th 1093 concluded:

“Allen argues the STR testing evidence should have been completely excluded because it has not been shown to satisfy the *Kelly* test. He complains the only evidence regarding general scientific acceptance consisted of the testimony from a Cellmark employee. We fail to see why that was not competent evidence of general acceptance in the scientific community. (See *State v. Jackson* (1998) 255 Neb. 68 [582 N.W.2d 317, 325] [director of lab that did DNA testing by PCR STR method testifies regarding acceptance in scientific community].)” (*People v. Allen, supra,* at p. 1099.)

**Similarly, in May of last year, in another opinion, the court of appeal reaffirmed the ruling in *People v. Allen, supra,* and rejected any notion that testimony of more than a single witness is required for a sufficient showing of general acceptance. Specifically, the court concluded:**

**“General acceptance in the scientific community may be established by the testimony of a director or supervisor of a DNA forensic lab.” (Citations omitted; *People v. Hill* (2001) 89 Cal.App.4th 48, 58.)**

 DNA testing technologies which have been exploited and applied to forensic investigation include the use of the "polymerase chain reaction" ("PCR") to produce DNA of sufficient quantity for genetic marker typing. PCR, itself simply a molecular biological tool, is employed to rapidly and efficiently prepare evidentiary material of both known and unknown origin for ultimate genetic marker analysis.

 First utilized in forensic casework in 1986 in a Pennsylvania homicide prosecution, forensic investigations utilizing PCR-based techniques have increased dramatically in the United States and abroad. Sexual assault and other crimes of violence involving biological evidence are routinely examined in many American and international jurisdictions with PCR-based typing systems.

 Developed by a California scientist who received the Nobel Prize in chemistry for his discovery, PCR has proven one of the most significant additions to molecular biology in this century. PCR-based DNA typing systems, including techniques employing mitochondrial DNA, are currently employed in fields such as human disease diagnosis, endangered species conservation and reproduction, and identification of the remains of violent death victims and American war dead.

 DNA restriction fragment length polymorphism ("RFLP") testing -- not employed in the present case -- necessitates dividing DNA into fragments of various sizes. (*People v. Axell* (1991) 235 Cal.App.3d 836, 846.) Because some of these fragments are relatively large, the RFLP testing process requires that DNA extracted from evidence material be well-preserved

-- in "high molecular weight" form -- for the procedure to be successfully employed.

 PCR amplification is utilized to genetically amplify smaller segments of DNA in order to produce sufficient sample for purposes of typing. The genetic marker “DQ-Alpha” has been typed in forensic investigations since 1986. Similar to RFLP typing, forensic use of PCR-based DQ-Alpha typing has increased rapidly both nationally and internationally since 1986. The Federal Bureau of Investigation, as well as numerous local, regional, state, and international laboratories, added DQ-Alpha and other PCR-based genetic markers – including short tandem repeats (“STR’s”) -- to their repertoire of typing programs.[[1]](#footnote-1)

 Forensic DNA PCR-based typing is neither new nor novel within the meaning of the *Kelly-Frye* standard. PCR-based testing, as utilized in the instant case and as was noted, *supra*, has been employed since 1986. Furthermore, even were this court to find that after 15 years PCR-based testing remains new or novel, general acceptance has been previously determined at numerous scientific and legal junctures.

 The National Research Council of the National Academy of Sciences, in its report, *DNA Technology in Forensic Science*, endorsed forensic uses of DNA typing technologies, including PCR-based analysis. In particular, the report states:

"Regarding the underlying principles, there is, as we have noted, no longer any question concerning the principle that DNA can be used to obtain identification information; admissibility hearings need no longer address the question. Regarding the particular method for applying the principle, the inquiry will depend on the **new method or technology**. . . In each case, the court can properly limit the inquiry to the **substantially novel aspects** of the technology, focusing on whether the method is accepted for scientific applications and whether it has been validated for forensic identification." (*DNA Technology in Forensic Science*, National Research Council (U.S.), National Academy of Sciences, 1992, at pp. 144-145 [Exhibit 7, attached]; emphasis added.)

 State supreme and intermediate appellate court opinions approving the admissibility of PCR-based typing exist in more than one-half the states of this country and have been chronicled in detail elsewhere. In addition, California case law has resolved the admissibility of PCR-based forensic typing. The First District, in an opinion delivered in March 1996, concluded that PCR-based forensic testing meets the *Frye* general acceptance standard. (*People v. Morganti* (Cal.App. 1996) 43 Cal.App.4th 643, 671.) Specifically, the Court of Appeal concluded:

 "In ruling that PCR analysis of the DQ alpha gene is generally accepted in the relevant scientific field, the trial court relied on expert testimony of two witnesses and extensive documentary evidence. The court found there is no significant controversy or dispute with respect to the reliability of this method and that the evidence did not indicate any flaw in the method or its use. Our review of the record confirms these findings." (*People v. Morganti*, *supra*, at p. 663.)

 The same court of appeal delivered a subsequent opinion in 1998 regarding the continued litigation of admissibility of forensic PCR-based DNA typing results. That court, in *People v. Wright* (1998) 62 Cal.App.4th 31, approved admissibility of both DQ-Alpha and Polymarker genetic marker typing results [five additional genetic markers typed following use of the PCR amplification process]. (*People v. Wright*, *supra*, at p. 41.)

 Importantly, the court of appeal underscored the fact that continued litigation of forensic PCR-based typing admissibility was unnecessary. Specifically, the court stated:

 "Our trial courts will no longer need to expend valuable time and resources on repetitive *Kelly*-*Frye* hearings directed to this issue of the admissibility of DNA evidence derived from the PCR method, as the trial court was forced to do in this case, now that the well-reasoned *Morganti* decision has become final. [Fn. omitted.] Issues as to the proper weight to be accorded to such evidence are for the jury, and may not be avoided by attempts to recast such jury issue as *Kelly*-*Frye* issues." (*People v. Wright*, *supra*, at pp. 42.)

 Evidence sought to be introduced by the People in the present case, as noted above, consists of PCR-based typing results derived from canine mitochondrial DNA. Mitochondrial DNA, unlike nuclear DNA, is both inherited maternally and contained within the cell, but outside the nucleus. While the People do not agree with defendant that canine mitochondrial DNA typing is sufficiently new or novel to require admissibility inquiry by this court [see discussion, *infra*], evidence to be presented this court – and case law outside the jurisidiction of California – amply demonstrate general acceptance and admissibility of mitochondrial DNA testing, whether human or animal.

 Mitochondrial DNA testing has been exploited for more than 20 years (*The Future of Forensic DNA Testing: Predictions of the Research and Development Working Group*, National Commission on the Future of DNA Evidence, U.S. Department of Justice, November 2000, pp. 18-19, 46-47.) The 1996 report of the National Research Council noted the usefulness of mitochondrial typing and concluded in 1996 that forensic mitochondrial DNA testing techniques ave been scientifically validated. (*The Evaluation of Forensic DNA Evidence*, National Research Council (U.S.), National Academy of Sciences, 1996, at pp. 72-73.)

 Significantly, the Supreme Courts of South Carolina, Tennessee, and Connecticut, and a court of appeal in North Carolina have approved the admissibility of mitochondrial DNA typing. Those courts have collectively concluded that mitochondrial typing is admissible by statute, relevant, reliable, validated, and generally accepted within the scientific community. (*State v. Council* (S.C. 1999) 515 S.E.2d 508, 517-518; *State v. Scott* (Tenn. 2000) 33 S.W.3d 746, 757-760; *State v. Pappas* (Conn. 2001) 776 A.2d 1091, 1108-1109; *State v. Underwood* (N.C.App. 1999) 518 S.E.2d 231, 239-240.)

 Evidence to be presented by the People will amply demonstrate general acceptance and appropriate admissibility of canine mitochondrial testing in the instant case.

**II**

**"CORRECT SCIENTIFIC PROCEDURES"**

**AND THE PROPER SCOPE OF *KELLY***

 The *Kelly* court added an additional inquiry in its 1976 decision, requiring the proponent to demonstrate that "correct scientific procedures" were used in the testing conducted in the particular case. (*People v. Kelly*, *supra*, at p. 30.) Some trial and appellate courts have improperly interpreted this provision to mandate that the procedures were employed "correctly" rather than that "correct" procedures were used.

 The California Supreme Court in *People v. Farmer* (1989) 47 Cal.3d 888, was confronted with a defense contention that footprint evidence was improperly seized and preserved, in violation of the requirements of *Kelly*-*Frye*. The court concluded the argument was without merit. Specifically, the court stated:

". . . the *Kelly*-*Frye* rule tests the fundamental validity of a new scientific methodology, not the degree of professionalism with which it is applied. (See, e.g., *People v. Coleman* [(1988) 46 Cal.3d 749], at p. 775.) Careless testing affects the weight of the evidence and not its admissibility, and must be attacked on cross-examination or by other expert testimony." (*People v. Farmer*, *supra*, at p. 913.)

 Similarly, in a defense-mounted attack on the use of electrophoresis in protein genetic marker typing, the First District concluded the *Farmer* rationale was determinative. In particular, the court of appeal noted:

"Much of appellant's argument at this level is directed towards a perceived bias on the part of Mr. Keel, as well as alleged careless testing procedures on the part of the Oakland Police Department Laboratory. `Careless testing affects the weight of the evidence and not its admissibility, and must be attacked on cross-examination or by other expert testimony.' (*People v. Farmer* (1989) 47 Cal.3d 888, 913.)" (*People v. Smith* (1989) 215 Cal.App.3d 19, 28.)

 More recently, the California Supreme Court has reaffirmed the fact that the manner in which testing is conducted does not bear on admissibility. In a death penalty blood and saliva stain protein analysis case, challenge was made to the admission of evidence based on alleged infirmity in the testing process. The Supreme Court dismissed the contention, concluding that the *Farmer-Smith* rationale was correct. (*People v. Cooper* (1991) 53 Cal.3d 771, 814.)

 The question of the scope of the third prong of *Kelly-Frye* with respect to DNA typing evidence has been addressed in California. The Court of Appeal in *People v. Morganti*, *supra,* responding to a challenge that the People failed to properly establish the use of correct procedures, noted:

 ". . .[W]hen general acceptance is established by precedent, the `third-prong hearing' that must be conducted will not approach the `complexity of a full-blown' *Kelly* hearing. ([*People v. Barney*, *supra*, at p. 825].) `All that is necessary in the limited third-prong hearing is a foundational showing that correct scientific procedures were used.' (*Ibid*.) The trial court properly found that the prosecution made the necessary foundational showing. Not only did Harmor testify that he followed established procedure or protocol, his testimony establishes that he followed the exact procedures that were deemed correct in *Yorba* [*People v. Yorba* (1989) 209 Cal.App.3d 1017].)" (*People v. Morganti*, *supra*, at pp. 661-662; see also *People v. Hill, supra,* at p. 58.)

 Significantly, the court later noted, "we focus on the correctness of the procedures that were used as opposed to the quality of the analyst's performance of those procedures." (*Id*., at p. 667.) More recently, the court of appeal in *People v. Wright*, *supra*, rejected contentions that possible sample contamination or confusion, or lack of "rigorous or controlled" procedures, implicated admissibility concerns. Instead, the court noted, such objections are properly raised before the trier of fact and not prior to evidence admission. (*People v. Wright*, *supra*, at p. 41.)

Finally, the California Supreme Court again addressed the meaning of correct scientific procedures in1998 in the context of DNA RFLP typing. (*People v. Venegas* (1998) 18 Cal.4th 47.) The supreme court reaffirmed earlier court of appeal conclusions that the determination of the third prong of *People v. Kelly*, *supra*, requires case-specific examination. (*People v. Venegas*, *supra*, at p. 81.)

 The court also concluded due to the inherent complexity of DNA typing, trial courts must first determine whether correct procedures were used by the testing laboratory in the case at issue. (*Id*, at pp. 80-81.) The court did note that "shortcomings such as mislabeling, mixing the wrong ingredients, or failing to follow routine precautions against contamination may well be amenable to evaluation by jurors without the assistance of expert testimony," and thus affect weight rather than admissibility. (*Id*, at p. 81.) Finally, the court stated that testimony in support of use of correct procedures can be presented solely by the examining analyst if that analyst sufficiently understands the "technique and its underlying theory." (*Ibid*.)

 To add further confusion and reinvigorate the debate regarding the exact showing required, the California Supreme Court later reiterated its comments in *People v. Venegas*, *supra*, and stated, “. . . *Kelly*-*Frye* requires determination 'whether a laboratory has **adopted** correct, scientifically accepted procedures' for conducting the test." (*People v. Roybal* (Cal. 1998) 19 Cal.4th 481; emphasis added.)

 The People will establish through testimony that correct scientific procedures were utilized in the instant case.

**CONCLUSION**

 Accordingly, for the above reasons, it is respectfully requested that defendant’s motion be denied.

Dated: June 2002

 Respectfully submitted,

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 Deputy District Attorney

 Attorneys for Plaintiff

1. Proceedings of the *International Symposium on Human Identification 1993*, Scottsdale, Arizona, Promega Corporation, September 27-30, 1993; Proceedings of the *Second International Symposium on the Forensic Aspects of DNA Analysis*, Laboratory Division, Federal Bureau of Investigation, Quantico, Virginia, March 29-April 2, 1993; Hammond, H.A., Jin, L., Zhong, Y., Caskey, C.T., and Chakraborty, R., *Evaluation of 13 Short Tandem Repeat Loci for Use in Personal Identification Applications*, American Journal of Human Genetics, Vol. 55, 1994, pp. 175-189; Alford, R.L., Hammond, H.A., Coto, I., and Caskey, C.T., *Rapid and Efficient Resolution of Parentage by Amplification of Short Tandem Repeats*, American Journal of Human Genetics, Vol. 55, 1994, pp. 190-195; Micka, K.A., et al, *TWGDAM Validation of a Nine-Locus and a Four-Locus Fluorescent STR Multiplex System*, Journal of Forensic Sciences, Vol. 44, No. 6, 1999, pp. 1243-1257. [↑](#footnote-ref-1)