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IN THE SUPREME COURT OF FLORIDA

ROBERT JAMES BRIM,

Petitioner,

v.

FSC NO. 85,596

STATE OF FLORIDA,

Respondent.

RESPONDENT'S BRIEF ON THE MERITS

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SUMMARY OF THE ARGUMENT

The court is aware of the various advantages and disadvantages of the relevancy approach as compared with the Frye test. While the state invites the court to consider the Second District's preferred approach, it appears as if the question has become academic due to recent studies, publications, and decisional law which has refuted the feared possibility of substructure. Therefore, concerns regarding general acceptance under the Frye standard have been alleviated and future disputes about the possibility of the inaccuracy of statistical data due to substructuring or otherwise go only to the weight of the evidence and not the admissibility.

In any case, the approach taken by the Second District was a correct application of the Frye test. Under the analysis in United States v. Bonds, infra, the cases discuss general acceptance in terms of "reliability" but refer only to the reliability of the procedures and process, not the reliability of the results of the procedures. The general acceptance test is designed to uncover whether there is general agreement of scientists in the field that the scientific data is not based on a novel theory or procedure that is "mere speculation or conjecture." There may be several different theories or procedures used concerning one type of scientific evidence, all of which are generally accepted. None may have the backing of

the majority of scientists, yet the theory or procedure can still be generally accepted. Questions about the accuracy of results are matters of weight, not admissibility.

Finally, it is debatable whether the Frye general acceptance test is applicable, since the Hardy-Weinberg theory is not new or novel. In fact, probability calculations are used daily in both experimental and theoretical fields of science. Statistical evidence should be admissible where it is sufficiently based on an adequate and scientific factual basis.

ARGUMENT

THE STATE INVITES THE HONORABLE COURT TO CONSIDER THE SECOND DISTRICT'S PREFERRED RELEVANCY APPROACH TO THE ADMISSIBILITY OF THE STATISTICAL PROBABILITY COMPONENT OF THE DNA PROFILE ANALYSIS ALTHOUGH IT APPEARS AS IF THE QUESTION HAS BECOME LARGELY ACADEMIC IN LIGHT OF RECENT STUDIES, PUBLICATIONS, AND DECISIONAL LAW WHICH HAVE REFUTED THE SUBSTRUCTURE ARGUMENTS OF FBI/FDLE CRITICS AND FUTURE DISPUTES ABOUT THE POSSIBILITY OF INACCURATE STATISTICAL DATA DUE TO SUBSTRUCTURING OR OTHERWISE GO ONLY TO THE WEIGHT OF THE EVIDENCE AND NOT THE ADMISSIBILITY.

The instant case is before the Honorable Court because the lower court, the Second District Court of Appeal, certified conflict with the First District Court of Appeal concerning the appropriate test for the admission of FBI/FDLE statistical probability calculations. The Second District agreed with Judge Orfinger's analysis in Andrews v. State, 533 So. 2d 841 (Fla. 5th DCA 1988), review denied, 542 So. 2d 1332 (Fla. 1989) that the "relevancy approach" is the preferred approach when faced with the admissibility of comparison techniques or deductions based upon the generally accepted scientific DNA analysis. Brim v. State, 654 So. 2d 184, 186 (Fla. 2d DCA 1995).

The Second District was apparently concerned regarding the negative outcomes which resulted from rigid application of the Frye test in the cases cited by the First District in Vargas v. State, 640 So. 2d 1139 (Fla. 1st DCA 1994). Although the Second District found that the two statistical probability calculations

below met the Frye test it found that "[i]t may be that a general relevancy test, one that does not limit the admissible scientific evidence to that reflected by one unanimous view, would be a more preferable, and perhaps realistic, test in such situations." Brim, 654 So. 2d at 187. Accordingly, the Second District certified conflict as to the application of Frye to the FBI/FDLE statistical probability calculation.

The state recognizes that the court is aware of the various advantages and disadvantages of the relevancy approach as compared with the Frye test and vice versa. See, e.g., United States v. Jakobetz, 955 F. 2d 786 (2d Cir. 1992), cert. denied, ___ U.S. ___, 113 S. Ct. 104, 121 L. Ed. 2d 63 (1992); United States v. Downing, 753 F. 2d 1224 (3d Cir. 1985); United States v. Williams, 583 F. 2d 1194 (2d Cir. 1978), cert. denied, 439 U.S. 1117, 99 S. Ct. 1025, 59 L. Ed. 2d 77 (1979); Andrews, 533 So. 2d at 841. See generally, Gianelli, The Admissibility of Novel Scientific Evidence: Frye v. United States A Half Century Later, 80 Colum. L. Rev. 1197 (1980); McCormick, Scientific Evidence: Defining A New Approach to Admissibility, 67 Iowa L. Rev. 879, 911-12 (1982).

While the state invites the court to consider the Second District's preferred approach, it appears as if the question has become largely academic due to recent studies, publications, and decisional law which have refuted the feared possibility of

substructure. Therefore, any concerns regarding general acceptance under the Frye standard have been alleviated and future disputes about the possibility of the inaccuracy of statistical data due to substructuring or otherwise go only to the weight of the evidence and not the admissibility.

The California experience with regard to the alleged dispute over the possibility of substructuring and the soundness of the FBI/FDLE product rule is enlightening. People v. Axell, 235 Cal. App. 3d 836, 1 Cal. Rptr. 2d 411 (Cal. Ct. App. 1991) was decided in October of 1991. On the issue of substructuring, the Axell court concluded that the state's evidence overcame defense fears about the possibility of substructuring, and established that Cellmark's methodology of calculating the statistical probability of a coincidental match was generally accepted in the scientific community. Thus, "[a]ny question or criticism of the size of the database or the ratio pertains to weight of the evidence and not to its admissibility." 235 Cal. App. 3d at 868, 1 Cal. Rptr. 2d 411.

After the decision in Axell, the December 20, 1991 edition of the journal Science was published. It contained an article by a Harvard University Professor, Richard C. Lewontin, and Washington University Professor Daniel L. Hartl, which attacked the failure of DNA statistical calculation analysis to account for substructuring. Lewontin & Hartl, Population Genetics in Forensic DNA Typing (Dec. 20, 1991) Science, vol. 254, p. 1745.

In another article appearing in the same issue of Science, University of Texas Professor Ranajit Chakraborty, and Dr. Kenneth Kidd, defended the practice of performing statistical calculations of probability estimates without regard to substructuring. Chakraborty & Kidd, The Utility of DNA Typing in Forensic Work (Dec. 20, 1991) Science, vol. 254, p. 1735.

In April 1992, the National Research Council (NRC), members of which are drawn from the councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine, issued a report on genetic profiling. NRC, DNA Technology in Forensic Science (1992). The NRC report acknowledged that substructuring was controversial but made no attempt to resolve the controversy. Rather, the report assumed "for the sake of discussion" that substructuring existed, and suggested methods to ensure that probability estimates rendered as part of the statistical calculation step of DNA analysis would be sufficiently conservative to take it into account. DNA Technology, at pp. 12-15, 79-85.

The foregoing developments resulted in a shift in California's judicial acceptance of the statistical probability component of the DNA RFLP profile analysis as exemplified by the opinion in People v. Barney, 8 Cal. App. 4th 798, 10 Cal. Rptr. 2d 731 (Cal. Ct. App. 1992). As the Barney court concluded:

Whatever the merits of the prior decisions on the statistical calculations process---

including Axell---the debate that erupted in Science in December 1991 changes the scientific landscape considerably, and demonstrates indisputably, that there is no general acceptance of the current process...simply put, Axell has been eclipsed on this point by subsequent scientific developments. In reaching a conclusion different from that in Axell, we do not express disagreement with Axell's reasoning at the time, but rather have progressed to a point on a continuum of scientific debate which neither the Axell court nor the two trial courts in the present cases could have anticipated.

8 Cal. App. 4th at pp. 820-821, 10 Cal. Rptr. 2d 731. Thus, based upon a perceived split within the scientific community concerning the potential existence of substructuring, the Barney court concluded that the entire DNA profile analysis was inadmissible. 8 Cal. App. 4th 823, 10 Cal. Rptr. 2d 745.

The more recent California opinions, and publications, however, indicate that concerns about potential substructuring have been refuted. For example, in People v. Soto, 30 Cal. App. 4th 340, 35 Cal. Rptr. 2d 846 (Cal. Ct. App. 1994) the Kelly-Frye hearing was held after Axell had been decided, and after the Lewontin & Hartl article had been published, but before Barney was decided. At the Kelly-Frye hearing, the experts addressed the question of whether the Science article demonstrated the scientific community no longer generally accepted forensic DNA analysis. The prosecution experts in Soto each testified to the accuracy of the product rule in frequency determinations

involving human populations, and the validity of the work, both analytical and mathematical, performed by the OCSD [Orange County Sheriff's Department] lab. They also uniformly attacked the scientific methodology as well as the conclusions of Hartl & Lewontin. 35 Cal. Rptr. 2d at 852.

Moreover, prosecution expert Dr. Chakraborty (the coauthor with Dr. Kidd of the "rebuttal" article in Science) had developed a series of tests to review and examine the assumptions of the Lewontin & Hartl article, and had produced "'hard data' proving there was no substructuring." 35 Cal. Rptr. 2d at 852 n.15.

The Soto court affirmed the trial court's determination that forensic DNA evidence still enjoyed "general acceptance" by the relevant scientific community:

The testimony before the court in this case clearly showed a consensus within the scientific community on the application of a probability calculation to the RFLP comparison. The only debate centered on which factor to use in that calculation. The trial court qualitatively assessed the relative merits of the respective experts based on their various credentials and research fields as well as their rationale and final opinions. It concluded the experts espousing application of the product rule reflected the "support of the clear majority of the members of the relevant scientific community[,]..." (cf. Leahy, supra, 8 Cal. 4th at p. 612, 34 Cal. Rptr. 2d 663, 882 P. 2d 321) which, in this case, are human population geneticists. Although a series of events---The NRC report, various court opinions on the subject, the FBI report, Lander & Hartl's shift---have substantially altered the face of information on the

subject, the trial court's decision remains correct today. (emphasis in original)

35 Cal. Rptr. 2d at 858. In the instant case, as in Soto, although the information on the subject has changed, the trial court's decision remains correct today.

The Soto court further noted that, since the trial, the FBI had published an exhaustive five-volume study of worldwide VNTR data that refutes the Hartl-Lewontin assumption that population subgroups affect DNA probability estimates to a defendant's disadvantage:

The study concludes, based on empirical evidence, "(1) that there are sufficient population data available to determine whether or not forensically significant differences might occur when using different population databases [sic]; (2) that subdivision, either by ethnic group or by U.S. geographic region, within a major population group does not substantially affect forensic estimates of the likelihood of the occurrence of a DNA profile; (3) that estimates of the likelihood of occurrence of a DNA profile using major population group databases (e.g., Caucasian, Black, and Hispanic) provide a greater range of frequencies than would estimates for subgroups of a major population category; therefore, the estimate of the likelihood of occurrence of a DNA profile derived by the current practice of employing the multiplication rule and using general population databases for allele frequencies is reliable, valid, and meaningful, without forensically significant consequences; and (4) that the data do not support the need for alternate procedures, such as the ceiling principle approach (NRC Report 1992), for deriving statistical estimates of DNA profile frequencies (Budowle et al. 1993a and 1993b submitted)."

35 Cal. Rptr. 2d at 856 (citing U.S. Dept. Justice, FBI Rep., VNTR Population Data: A Worldwide Study, Vol. IA (1993) p.2.) The new data supplied by the FBI provide further support for the use of the product rule and indicates that previous concerns regarding general acceptance were overrated.

As recognized by People v. Wilds, 31 Cal. App. 4th 636, 37 Cal. Rptr. 2d 351 (Cal. Ct. App. 1995), an even more recent publication, also discussed by Soto, further contributes to the conclusion that statistical calculation using the product rule satisfies Kelly-Frye. In the October 27, 1994 issue of the journal Nature, one of the original opponents of RFLP analysis teamed with a former adversary to proclaim that "[t]he DNA fingerprinting wars are over." Lander & Budowle, DNA Fingerprinting Dispute Laid To Rest, Nature (Oct. 27, 1994) vol. 371, p.735.

In the article, Lander (a prominent early critic of DNA profiling) and Budowle (one of the principle architects of the FBI's DNA program) aptly describe themselves as "represent[ing] the range of scientific debate." Lander & Budowle, supra, at 735. Together Lander and Budowle criticized the NRC for being overly conservative in its recommendations for dealing with the possibility of substructuring. They further suggested that the recommendations were premised on Lewontin and Hartl's "flawed analysis," and had "allowed a minor academic debate to snowball

to the point that it threatens to undermine the use of DNA fingerprinting." Lander & Budowle, supra, at p.737, note omitted. Thus, in view of the recent developments, it can safely be said that concerns regarding the accuracy of the product rule go to weight and not to admissibility. Soto, 35 Cal. Rptr. 2d at 858.

The Second District's decision that two differing but generally accepted statistical probability calculations were admissible and properly heard by the jury was eminently correct. As the Soto court recognized, this is "...exactly the approach the most conservative scientists advocated." 35 Cal. Rptr. 2d at 858. In Soto, the Axell decision had already established the evidentiary reliability for Kelly purposes and the defense experts' skepticism was relevant to the jury's consideration of the weight to be accorded to the scientific evidence. Id.

In the instant case, the Jakobetz and Yee¹ cases had already established the reliability of the statistical probability calculations and, likewise, the defense expert's skepticism was relevant to the weight to be accorded to the scientific evidence.

The lower court's reliance on Bundy v. State, 455 So. 2d 330 (Fla. 1984), cert. denied, 476 U.S. 1109, 106 S. Ct. 1958, 90 L. Ed. 2d 366 (1986) (Bundy I) was appropriate where the court found that since the proffered evidence met the criterion of reliabil-

¹United States v. Yee, 134 F.R.D. 161 (N.D. Ohio 1991), aff'd sub nom. United States v. Bonds, 12 F. 3d 540 (6th Cir. 1993).

ity, the details of the comparison techniques were matters of credibility and weight of the evidence for the jury to determine. The Bundy court found the science of odontology similar to hair-comparison evidence, which is admissible even though it does not result in identifications of absolute certainty as fingerprints do. Jent v. State, 408 So. 2d 1024 (Fla. 1981), cert. denied, 457 U.S. 1111, 102 S. Ct. 2916, 73 L. Ed. 2d 1322 (1982).

In this regard, the discussion of general acceptance in United States v. Bonds, 12 F. 3d 540 (6th Cir. 1993) is instructive. The Bonds court found that under its pre-Daubert case law general acceptance exists when a substantial portion of the pertinent scientific community accepts the theory, principles, and methodology underlying scientific testimony because they are grounded in valid scientific principles. Id. at 561.

The Bonds court recognized that the cases discuss general acceptance in terms of "reliability" but refer only to the reliability of the procedures and process, not the reliability of the results of the procedures. According to the Bonds court, "[d]isputes about specific techniques used or the accuracy of the results generated go to the weight, not to the admissibility of the scientific evidence." Id. See also United States v. Brown, 557 F. 2d 541 (6th Cir. 1977); United States v. Stifel, 433 F. 2d 431 (6th Cir. 1970), cert. denied, 401 U.S. 994, 91 S. Ct. 1232, 28 L. Ed. 2d 531 (1971).

In Bonds, the district court magistrate had concluded that general acceptance does not require that there be "unanimity, or consensus within the scientific community concerning such acceptability." 12 F. 3d at 562. The defendants vigorously objected to the magistrate's finding concerning unanimity. The Sixth Circuit responded as follows:

... our precedent demonstrates that while ordinarily the principles and procedures must be accepted by a majority of those in the pertinent scientific community, the absence of a majority does not necessarily rule out general acceptance. The general acceptance test is designed only to uncover whether there is a general agreement of scientists in the field that this scientific data is not based on a novel theory or procedure that is "mere speculation or conjecture." Brown, 557 F. 2d at 559. In some instances, there may be several different theories or procedures used concerning one type of scientific evidence, all of which are generally accepted. None may have the backing of the majority of scientists, yet the theory or procedure can still be generally accepted. And even substantial criticism as to one theory or procedure will not be enough to find that the theory/procedure is not generally accepted. Only when a theory or procedure does not have the acceptance of most of the pertinent scientific community, and in fact a substantial part of the scientific community disfavors the principle or procedure, will it not be generally accepted. See, e.g., Novak v. United States, 865 F. 2d 718, 725 (6th Cir. 1989) (theories were neither "widely accepted" or "generally accepted" in the medical community).

... [t]he government's experts, some of whom were from outside the FBI lab, clearly indicated that the FBI's DNA procedures were generally accepted. Despite their rebuttal

criticism, the defendant's experts did not in fact show that the procedures were not generally accepted; they only showed a substantial controversy over whether the results produced were reliable and accurate ... [w]e hold that questions about the accuracy of results are matters of weight, not admissibility.

Bonds, 12 F. 3d at 562-63. The Bonds court went on to compare the controversy over the certainty of the statistical probability analysis of DNA to hair analysis which is comparable to the comparison made by the lower court in the instant case.²

The state submits that on close analysis the Frye test is not applicable to the statistical probability calculation portion of the DNA RFLP profile analysis. This is because the four-step analysis outlined in Ramirez v. State, 651 So. 2d 1164 (Fla. 1995) applies only to expert opinion testimony concerning a new or novel scientific principle. However, as Dr. Kevin McElfresh, the state's expert in population genetics, testified at trial, the Hardy-Weinberg theory is generally accepted and has been the

²The Bonds court specifically noted the defendant's substructure argument and found that it involved a dispute over the accuracy of the probability results and concluded that this criticism was a matter of the weight of the evidence and not admissibility. Bonds, 12 F. 3d at 564. See also Jakobetz, 955 F. 2d at 786; People v. Wesley, 83 N.Y. 2d 417, 633 N.E. 2d 451 (N.Y. 1994); State v. Pierce, 64 Ohio St. 3d 490, 597 N.E. 2d 107 (Ohio 1992); Smith v. Deppish, 248 Kan. 217, 807 P. 2d 144 (Kan. 1991); People v. Adams, 195 Mich. App. 267, 489 N.W. 2d 192 (Mich. Ct. App. 1992); but see, e.g., United States v. Porter, 618 A. 2d 629 (D.C. 1992); People v. Barney, 8 Cal. App. 4th 798, 10 Cal. Rptr. 2d 731 (Cal. Ct. App. 1992); Commonwealth v. Lanigan, 413 Mass. 154, 596 N.E. 2d 311 (1992).

cornerstone of population genetics for over eighty years. (R. 451) As Dr. McElfresh analogized concerning the problems raised by the potential of subgrouping, new developments in automotive technology do not invalidate what we know about cars. A 1966 Mustang is no less valid than a 1992 Mustang. (R. 479)

The questionable novelty of the use of the Hardy-Weinberg principle in calculating the statistical probabilities of a random match between the known and the unknown sample was discussed in Andrews:

The frequency by which given DNA bands appear in the population is calculated by using an established statistical database, employing a statistical formula known as the Hardy-Weinberg equilibria. This principle is used for determining other genetic characteristics such as blood type or RH factors, dates back to the 1920's and has been generally accepted in the scientific community as being accurate for this calculation. Appellant contends that the database of 710 samples is too small to be statistically significant. The only evidence in this case supports the statistical value of the randomly selected samples. The testimony reveals that as the database expands, the probability numbers do not change statistically, and that the American Association of Blood Banks, in its book entitled Probability of Inclusion In Paternity Testing (1982) concludes that a database of two to five hundred samples was found to provide adequate statistical results.

Id. at 850. See also Soto, 35 Cal. Rptr. 2d at 851 n.11 (Hardy-Weinberg theory formulated almost a century ago). Thus, it is questionable whether Frye is applicable to a statistical

probability calculation premised on Hardy-Weinberg and, therefore, the relevancy standard would be appropriate for the admission of such evidence.

The everyday use of probability calculations is another reason the relevancy standard is more appropriate for the admission of such evidence:

Probability calculations such as this are rendered daily in both experimental and theoretical fields of science. "The business of science is to make this complicated world seem as simple as possible, simple enough for our mental grasp, and in performing this task it finds statistics indispensable. Astronomers, economists, physicists, physiologists, psychologists---scientific workers of every discipline---all rely on the same basic principles of probability to test the validity of their hypotheses..." (Diamond, *The World of Probability: Statistics in Science* (1964) p.177.)

Soto, 35 Cal. Rptr. 2d at 850 (see also n.9 further discussing the theory of probability). The Soto court notes that blood-typing evidence can, by statute, be conclusive on the issue of paternity, although it is less precise, yet the courts and legislature accept it without hesitation. 35 Cal. Rptr. 2d at 859.

In Martinez v. State, 549 So. 2d 694 (Fla. 5th DCA 1989) it was recognized that other jurisdictions have admitted statistical evidence where it is sufficiently based on an adequate scientific and factual basis:

Where courts and commentators have been reluctant to admit statistical evidence, that reluctance has stemmed largely from the fact that the probabilities on which the evidence depended were based on mere speculation or were characterized in such a way to mislead or confuse the jury. See, e.g., Commonwealth v. Drayton, 386 Mass. 39, 50-51, 434 N.E. 2d 997 (1982)(manner of presentation may make statistical evidence misleading); People v. Collins, 68 Cal. 2d 319, 66 Cal. Rptr. 497, 438 P. 2d 33 (1968)(en banc)(prosecution presented probabilities without any underlying factual basis); People v. Harbold, 124 Ill. App. 3d 363, 381-383, 79 Ill. Dec. 830, 464 N.E. 2d 734 (1984)(statistical evidence must rest on adequate factual basis and, even then, potential for confusion outweighs minimal probative value). See also Tribe, Trial by Mathematics: Precision and Ritual In The Legal Process, 84 Harv. L. Rev. 1329 (1971). Courts have legitimately feared that statistics might be employed as a way 'to assign a number to the probability of guilt or innocence.' People v. Collins, supra at 330 [66 Cal. Rptr. 497, 438 P. 2d 33]. On the other hand, where the statistical evidence is shown to be based on accepted scientific principles, courts, including this one have admitted such evidence. Commonwealth v. Beausoleil, 397 Mass. 206, 217-218 n.15, 490 N.E. 2d 788 (1986)(evidence as to probability of paternity using HLA test admissible where estimate is 'based on accepted scientific principles'). People v. Alzoubi, 133 Ill. App. 3d 806, 809, 89 Ill. Dec. 202, 479 N.E. 2d 1208 (1985)(same). Davis v. State, 476 N. Ed. 2d 127, 134-135 (Ind. App. 1985)('where probability testimony is based on empirical scientific data, rather than unsubstantiated estimates, the presentation and admission of probability testimony need not constitute error'). State v. Washington, 229 Kan. 47, 622 P. 2d 986 (1981)(expert permitted to testify in a murder prosecution that only 0.6% of the population had same blood characteristics as defendant). (emphasis in original)

549 So. 2d at 696 (quoting Commonwealth v. Gomes, 403 Mass. 258, 526 N.E. 2d 1270, 1280 (1988)). Therefore, so long as statistical evidence is not misleading or unduly prejudicial it should be admitted into evidence.

The error committed by the Vargas court as well as those cases which it reviews excluding the entire DNA profile or remanding for the determination of the possibility of a consensus concerning a more conservative estimate is the low opinion of the jury's ability to analyze the credibility of the evidence. As recognized by the Jakobetz court "[d]espite the difficulties involved in cases with novel, complex, and confusing evidence, the jury must retain its fact-finding function." Id. at 796. The tools of the adversary system are well adapted for testing potentially incredible evidence. These tools are "[v]igorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof..." Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. ___, 113 S. Ct. ___, 125 L. Ed. 2d 469, 484 (1993).

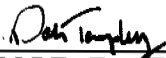
In view of the foregoing, the admission into evidence of two differing, but generally accepted, methods of calculating the probabilities of a random match should be affirmed and the relevancy approach should apply to the admission of the statistical probability calculation step of the DNA RFLP profile analysis.

CONCLUSION


In light of the foregoing facts, arguments, and authorities, the lower court's ruling concerning the denial of the motion in limine should be affirmed because the precise accuracy of each of the generally accepted approaches to the statistical probability calculation was a matter of weight for the jury to determine; in addition, the relevancy standard should apply to the admission of the DNA statistical probability evidence.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true and correct copy of the foregoing has been furnished by U.S. Mail to Jennifer Y. Fogle, Assistant Public Defender, Public Defender's Office, P.O. Box 9000, Drawer P.D., Bartow, Florida 33831 on this 27th day of July 1995.

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