State of Washington)

County of Snohomish)

AFFIDAVIT OF DONALD RILEY, PH.D.

Before the undersigned Notary Public, duly qualified and acting in and for said county and state, appeared Donald Riley, to me well known to be the declarant herein, who state the following under oath:

1. I have a Ph.D. in Biochemistry from the University of Washington and a Bachelor of Science degree in Chemistry from Washington State University. I have two years of postdoctoral fellowship training at Princeton University. In addition, I have over 30 years professional research experience studying DNA and related molecules. I have published 70 research articles in anonymously peer-reviewed journals. Several of these articles have been referenced by forensic journals and websites. A DNA sequence I discovered and published has been recommended as a potentially useful forensic DNA test by two, independent research groups. I have a DNA consulting business and have served as a consultant for multiple biotechnology companies and forensic DNA cases. I also published a popular article, "DNA testing, an Introduction for Non-scientists."
2. This article has been requested as course material by a variety of forensic interest seminars and is recommended reading by the American Academy of Forensic Sciences, Young Forensic Sciences Forum. The same article is listed as a forensic science resource article at multiple universities and was cited by numerous forensic DNA websites, clinical DNA websites and public library websites.

3. I was recently hired by defense attorney, Michael Burt to review materials in the above named cases. I was provided with and reviewed the following materials:

   A Misskelly and Echols/Baldwin trial transcripts of testimony by Kermit Channell and Michael DeGuglielmo.

   B The State's closing argument transcript from the Misskelly trial.

   C The Channell 060193 report

   D Channell lab notes

   E Channell letter 051993

   F Genetic Design Report 071393

   G Quantiblot User's Guide (This document was already present in my collection prior to being hired in the above named cases)

4. At trial, Mr. Channell testified that he performed semen screening tests on pairs of pants, items Q6 and Q10. The first of these tests was referred to as a "laser" or alternate light source. Unfortunately, such lights are not specific for semen. These lights can be used to locate stains on material but there are many biological and non-biological substances that will glow under these lights. Virtually all biological material including human tissues, plants and microbes contain molecules that fluoresce. To name a few, the amino acids tyrosine, tryptophan and phenylalanine, widely present in biological materials fluoresce. False positive results when using alternate light sources to search for semen have been documented. Urine, saliva and other materials will glow under alternate light sources. Mr. Channell may have been unaware of the wide range of materials that fluoresce. In any case, he seemed aware that the alternate light source was not specific for semen. In

my opinion, he resisted the implication he found semen, but failed to adequately inform the court and the jury of this fact.

5. In his closing argument (Misskelly case) the prosecutor stated, "Now if you'll recall Kermit Channell from the crime lab said that on–in his tests–on the little boy's pants that he ran screening tests ran one screening test and it came back positive–positive for semen. He ran a second screening test–positive for semen." These statements misrepresent and overstate Mr. Channell's testimony. As a summary of Mr. Channell's testimony "positive for semen" couldn't be much more misleading. This was at least a serious scientific failure.
6. In fact, Mr. Channell was very reluctant to confirm there was semen. Since non-scientists are untrained in the importance of controls, false positive results, nonspecificity and other scientific issues, Mr. Channell really needed to go the extra mile to emphasize these points in order to prevent the misunderstanding or misuse that occurred.
7. The second screening test performed was acid phosphatase. While it is true semen has acid phosphatase, many other tissues have this enzyme including at least 16 different acid phosphatases. Microbes expected to be present in drainage water have the enzyme as well. In handwriting on his letter/report of 5-19-93 is the note: "poss. bacterial in nature." This referred to the cuttings Q6 and Q10 questioned stains from the blue jeans. This indicates to me that bacteria may have been identified during microscopic examination. Presence of bacteria and other microbes in muddy drainage water is certainly expected.

8. A weak positive acid phosphatase test is by no means definitive for semen. Acid phosphatase is widely recognized as only presumptive and not confirmatory of presence of semen.

9. Another test performed was p30, sometimes referred to as PSA (prostate specific antigen). Mr. Channell indicated that his substrate control reaction was also positive. This completely nullifies results from the putative stain. No conclusions can be drawn when the substrate control is positive. At various times, Mr. Channell indicated that the results for p30 were false positive. He also indicated that he performed a microscopic search and found no sperm and that microscopic observation was what he needed to confirm presence of semen. In his report, he also indicated that no semen was found.

10. At the Misskelly trial, Mr. DeGuglielmo testified that he found a very small, marginal amount of DNA in the "male fractions" from the pants. At the Echols/Baldwin trial, referring to the same samples according to my reading, he is more specific stating it was 50 picograms. According to manufacturer's recommendations for the test kit he was using this was well below margin.[1] Confirming sample insufficiency (perhaps combined with or exacerbated by inhibition) he did not get a usable result.

11. Mr. DeGuglielmo's testimony strongly implies that since this amount (very near the vanishing point) of DNA showed up in the sperm or male fraction, that was evidence of semen. This was incorrect for several reasons:

    A No sperm were found by microscope.

    B The term "male fraction" is a misnomer. The term refers to the method used. When no sperm are present, the term male fraction unfortunately remains the same. The

[1] I make that statement based on common protocols of the time where 5 microliters were typically used for the quantitation step. By my calculation and assuming the typically used protocol, Mr. DeGuglielmo would have had 0.2 nanograms of DNA available for the test at most.

term " male fraction" is highly misleading when no sperm are present. Some laboratories use less prejudicial terms such as E1 and E2 fractions to avoid misleading the jury.

C While Mr. DeGuglielmo seemed convinced that appearance of a small amount of DNA in the "male fraction" instead of the female fraction was evidence of semen, this conclusion was unwarranted for reasons that follow.

12. The male fraction preparation begins when a chemical called DTT[2] is added to the DNA extraction solution. This is done because the membranous-protein outer layer of sperm cells is held together in part by disulphide bonds (two sulphur atoms bonded together forming a bridge between proteins). DTT disrupts those bonds facilitating the release of the sperm DNA.

13. Unfortunately, Mr. DeGuglielmo seemed unaware that disulphide bonds are also involved in the membranous-protein layer of diverse microbes. There are many thousands of microbial species in nature including virtually countless species of bacterial, fungi and other organisms. Microbes with disulfide laden membranes are expected to behave like sperm in the extraction procedure Mr. DeGuglielmo used. Since no sperm were observed, the microbial explanation is plausible.

14. Mr. DeGuglielmo also testified that the quantitation procedure he used was specific for human or primate DNA. This is simply not established. The product insert for the Quantiblot kit that he used cites non-primate species that were tested. The only microbes listed were E. coli and an unnamed yeast species. E. coli and yeast certainly do not represent the microbial world and it unreasonable to suggest they represent the microbial life present in muddy water. Moreover, the insert suggests that the Quantiblot system

[1] dithiothreitol

will give results with non-primate species they tested at the level of 0.15 nanograms or less. The 0.05 nanograms found in the instant cases is obviously less. Again, a microbial explanation is plausible.

15. The most sensitive tests applied were the microscopic examination and PCR (polymerase chain reaction)-based tests. Mr. Channell testified that a PCR-based test called DQ alpha was applied and they were unable to get a result.[3] In still another analysis, in their report of 12-30-05, the Bode Technology group reported they obtained no result from the "SF" fraction (abbreviation for "sperm fraction" again referring to the method used not factual presence of sperm) of the pants cutting 2S04-114-25. This referred to a PCR-based test using the commercially supplied PowerPlex 16 kit. Thus, the three most sensitive tests applied, to the best of my knowledge, failed to yield any evidence of sperm or sperm DNA. Therefore, a microbial source for the very small amount of DNA in Mr. Channell's original Quantiblot test seems a more viable explanation than the presence of sperm.

16. Based on a letter dated in May of 1993 from Gary Gitchell of the West Memphis Police Department, the laboratory was under remarkable pressure to come up with results. While I agree that the cause, finding the killer(s) of the boys, was important and very worthy of effort such pressure is likely to interfere with scientific objectivity that is crucial to the scientific method. Familiarity with these cases led me to the conclusion that the analysts needed to be far more emphatic in their depiction of technologies limitations to make sure their results were not misconstrued.

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[3] It was unclear whether he was referring to DQ alpha run by himself or by Genetic Design who reported no DQ alpha result (7-13-93) for the jeans, Q6 and Q10. Genetic Design concluded the lack of result was due to inhibition but presence of microbial DNA rather than human DNA could account for apparent inhibition.

17. Based on my reading, the juries in these cases were unfortunately misled as to how totally inconclusive the results related to semen testing were. Mr. Deguglielmo's suggestion that his differential extraction provided evidence of semen was wrong. His opinion appears based on trust of the Quantiblot kit manufacturer, unfamiliarity with the Quantiblot package insert regarding non-primate DNA and apparent ignorance of how common disulfide bonds are. Based on my reading and to the best of my knowledge, there was no real evidence of semen but the jury may have been led to believe there was.

IN WITNESS WHEREOF, I hereunto set my hand this 29th day of May, 2008.

Donald Riley, Ph.D.

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State of Washington)
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County of Snohomish)

Subscribed and sworn to (or affirmed) before me of this 29th day of May, 2008, by Donald Riley who is personally known to me or proved to me on the bases of satisfactory evidence to be the person who appeared before me.

Notary Public

NOTARY PUBLIC
STATE OF WASHINGTON
JOHN R. LEATY
My appointment expires Mar. 26, 2010