

**Addendum to Report on
Forensic Science Matters
to the Commission of Inquiry re: James Driskell**

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It has been brought to my attention that the discussion of the microscopic hair analysis and the mitochondrial DNA test results at pp. 23-24 of my August 17, 2006 Report may not have been entirely clear, and is capable of being misinterpreted. In particular, the concern has been raised that my observation that “[t]he possibility of the conclusions [*i.e.*, Mr. Christianson’s conclusions that three questioned hairs were microscopically similar to the hairs from the grave site] being a chance occurrence seems remote but must be considered” (at p. 24; see also p. 33) might be misread as implying that the other two possibilities set out at p. 23 are more likely explanations. This, I should emphasize, is not the point I was attempting to make. Accordingly, in order to clarify my meaning, I have prepared this addendum to my Report expanding on the discussion at pp. 23-24.

The three possible explanations for the apparently divergent conclusions reached by Mr. Christianson and Mr. Bark listed at p. 23 of my Report arise as a matter of logic. The first possibility – namely, that the three questioned hairs were in fact microscopically dissimilar, and that Mr. Christianson erred in concluding otherwise – cannot be ruled out. However, as I explain at p. 23 of my Report, the lack of detail in Mr. Christianson’s work notes as to the characteristics of the questioned hairs makes it impossible to assess the validity of his observations from the paper record. The only way of definitely confirming or refuting this possibility would be for another qualified hair examiner to re-examine the hairs using a comparison microscope. If this kind of re-examination had been performed

at the time, it would have given some measure of confidence that Mr. Christianson's microscopic observations were verifiable. However, as explained elsewhere in my Report (pp. 10, 15, 19), the RCMP FLS protocol at the time did not mandate microscopic re-examination of "positive" comparisons by a second qualified hair examiner, and this was apparently not done in this case. Since some or all the hairs have now been consumed by the mtDNA analysis,¹ it may, as stated at p. 23 of my Report, no longer be feasible to conduct a microscopic re-examination of the hairs. As explained elsewhere my Report (pp. 7-8), Mr. Christianson appears to have been a well-trained and generally competent hair examiner. However, the possibility that his observations were inaccurate cannot be ruled out.

The second logical possibility that must be considered is that Mr. Bark's mtDNA analyses were incorrect. As I note at p. 23 of my Report, I have not had an opportunity to examine Mr. Bark's work notes, nor am I an expert in the area of DNA analysis. However, the scientific principles on which mtDNA analysis is based are well-understood, and there is no inherent reason to be sceptical of the general validity of mtDNA analysis. The FSS is a highly reputable forensic laboratory system that is well known to have very thorough quality assurance procedures. Further, as I indicated at footnote 66 on p. 23 of my Report, in the circumstances the possibility that Mr. Bark's results were affected by contamination seem unlikely. While I am not in a position to conclusively eliminate any possibility of error in the FSS mtDNA results, there is no concrete evidence supporting this possibility and it seems to me to be highly unlikely.

¹ Mr. Bark's report does not set out the precise amount of the hairs that were consumed in the mtDNA analysis. However, in their 2005 paper, which I refer to at p. 25 of my Report, Melton et al. note that in their tests of 691 hair samples, the length of hair consumed ranged from 0.2 cm to 4.6 cm, with an average of 1.9 cm \pm 0.83 cm, and that 37.9 % of the tested hairs were entirely consumed in the testing.

I should add that since preparing my Report I have had an opportunity to read the September 8, 2006 letter from Dr. Terry Melton of Mitotyping Technologies to Mr. James Lockyer, and agree with Dr. Melton's observations on the issue of contamination.

The third remaining logical possibility is that both sets of results are "correct" – that is, that the three Q hairs were not Mr. Harder's hairs (as indicated by the mtDNA test results), but were nevertheless microscopically similar to his hairs (as Mr. Christianson concluded). By characterizing this possibility as "remote", as I do in my Report, I do not mean to imply that this is a less likely possibility than the prospect of error in either the mtDNA or the microscopic comparison results. Indeed, the Houck and Budowle study I refer to at p. 27 of my Report raises the possibility that the occurrence of microscopically similar hairs in the population may be considerably higher than was once believed. While the prospect of Mr. Driskell's van containing hairs from three different people that were all microscopically indistinguishable from Mr. Harder's hairs can still be characterized as a "remote" likelihood, it is not so remote that it can be eliminated from consideration. In contrast, as I noted at footnote 66 of p. 23 of my Report, in the circumstances the prospect that the FSS mtDNA results resulted from contamination is, in my view, so unlikely that "I have not ... considered [it] as a possible explanation" [emphasis added]

To sum up, while the three logical possibilities stated in my Report for the different examination results in this case can all fairly be described as "unlikely" when viewed in isolation, one of them must be true. I believe incorrect mtDNA results is the least likely of the three. The other two possible explanations are coincidence, or incorrect microscopy observations by Mr. Christianson. While the possibility of coincidence may

appear remote, it cannot be eliminated. Accordingly, it is not the case, in my view, that accepting the accuracy of the mtDNA results necessarily leads to the conclusion that Mr. Christianson erred in concluding that three of the Q hairs were microscopically similar to the K hairs. It is possible that both examiners' conclusions are correct since they are based on totally different parameters.