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John T. Philipsborn Law Offices
Civic Center Building Suite 250
507 Polk Street
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RE: *State v. Baldwin, Echols, and Misskelley*

Dear Mr. Philipsborn,

This letter is pursuant to my February 2, 2004 letter to you regarding the captioned case. In that letter, I had described to you my review of documents from the Arkansas State Crime Laboratory (ASCL) from the original forensic work done on the fiber evidence in this case. At that time I had expressed my concerns about the completeness of the examination notes, the documentation itself, the quality of the scientific work done by Sakevicius and Kilbourn, as well as their testimonies at trial. In my February 2, 2004 letter, I had concluded,

Ultimately, the bench notes and analytical data do not support the reports insofar as the notes, etc. appear to be incomplete. The instrumentation and methods used originally are themselves appropriate for fiber analysis but it is not discernible that they were applied *appropriately* in these analyses. The scattered nature of the note-taking, the spectra, and the lack of comprehensive documentation leads me to question the quality of the work performed. (page 2)

My recommendation at that time was to recover as much documentation as possible from the ASCL examinations and case files and to have all of the original hair and fiber evidence, to include debris removed from evidence items, known samples, and any subsidiary evidence, re-examined by an independent qualified scientist.

At your request, on April 25th, 2012, I reviewed the evidence submitted by ASCL to Chris Bommarito in the captioned case at his laboratory facility, Forensic Science Consultants, in Williamston, MI. Mr. Bommarito and I discussed the evidence, his data, the ASCL data, and all relevant notes and paperwork provided to date. This report summarizes my review and evaluation.

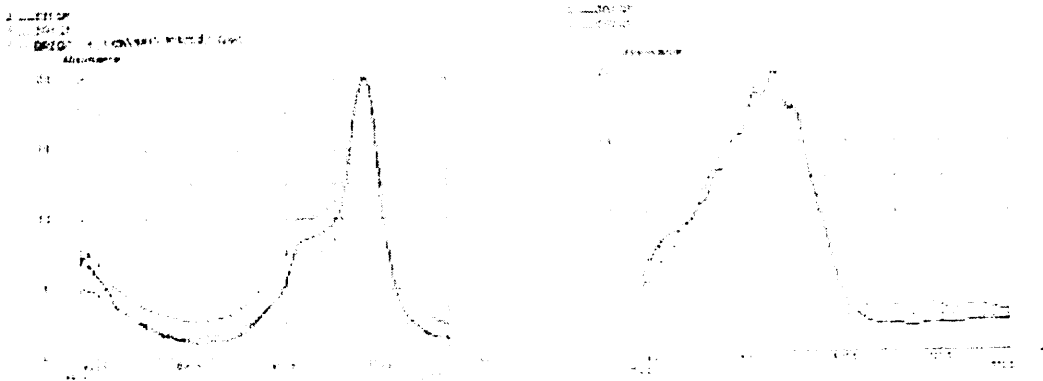
I personally reviewed each questioned microscopic sample provided to Mr. Bommarito by ASCL as well as the known samples he mounted from the materials provided by ASCL using his equipment. I confirmed Mr. Bommarito's results, namely that none of the questioned fiber samples provided by ASCL could be associated with the known fiber samples; that is, all of the known fiber samples provided by ASCL that could be analyzed were excluded as being sources for the questioned fibers, specifically evidence from E1, E3, E5, E9, E79, E92, and E134. These results were independently supported by Dr. Goodpaster's work on the color analysis (microspectrophotometry), the data and results of which I also reviewed.

The fiber analysis conducted and the data generated by Mr. Bommarito, as well as Dr. Goodpaster's work, provides additional support to my previous concerns about the quality of the original forensic fiber analysis in this case. The sloppiness of the notes, the lack of data and documentation, the erratic nature of the color analysis data all suggest scientists who were poorly trained to do the casework they were responsible for and were operating at the margin of competency, were derelict in their assigned duties, or were otherwise unable to properly conduct this kind of scientific work.



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One questioned that developed during the review of the color data was the nature and characteristics of the spectra (graphs plotting absorption intensity against the wavelength of light being absorbed) created by ASCL and, presumably, Ms. Sakevicius who signed the report. Some of the spectra appear normal for the kind and vintage of instrument used to analyze color at the time of the original examination. An example of a "normal" looking spectrum from the case file is below on the left. Some of the spectra, however, appear as does the one on the right, below. Notice the quality of the lines making up the peaks, demonstrating numerous small, serrated peaks throughout the spectrum. Contrast these with the "normal" peaks on the left, which are more or less smooth, gradual, and continuous.



As I mentioned, several of the fiber color spectra provided by ASCL have this "ragged" appearance. This kind of peak shape would not be expected from a properly tuned and calibrated instrument operated by a qualified scientist. In fact, Mr. Bommarito and I were stymied for a reason as to why the spectra would appear this ragged; we are both extensively experienced with this kind of instrumentation and its performance and neither of us had seen spectra with these characteristics. The examination notes are insufficient to describe the relevant instrument parameters (although some information is listed in the case file), specify the fibers analyzed (for example, although BR1 and BR2 are listed in both of the two spectra above, there is nothing to indicate if these were the same or different fibers analyzed for color), or to explain the discrepancies between the spectra.

Another example of a potential lack of competence, skill, or knowledge would be the black polyester fibers (E134 and E78). Mr. Bommarito and I observed a difference in the dichroism of those fibers. Dichroism is a phenomenon known to any microscopist trained in the basics of polarized light microscopy, a prerequisite for any trace evidence scientist. A fiber is said to be dichroic when it exhibits different coloration in different orientations under polarized light. Normal light, as from a light bulb or the sun, travels in all directions equally. Normal light can be polarized by restricting its travel to only one direction with a special filter, typically described as being oriented either "north-south" or "east-west". Polarized sunglasses, for example, are basically polarized filters that restrict the direction of light to only a "north-south" orientation, allowing only half the light and only the light that is not part of glare, such as that bouncing off the hood of a car, to pass to the eye. In microscopy, polarized filters are useful to discern various characteristics of materials, like fibers. Fibers exhibit dichroism when they and the dyes used to color them are highly oriented, causing the colors to be differentially absorbed by the polarizing filter. This can result in the phenomena Mr. Bommarito and I witnessed in the fibers. Because the phenomenon of dichroism is fundamental to the polymer the fiber is made of, the way in which the fiber is manufactured, the dyes used to color the fiber, and the way in which the dye is applied to the fiber, a difference in dichroism between two fibers or fiber samples is de facto an exclusion, assuming a homogeneous known sample. Another way to state this, given a difference in dichroism, which would be observed quite early in a fiber examination, there would be no reason for conducting any further comparative analysis. Dichroism is



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taught in every microscope course and every forensic fiber course I am aware of. As an instructor at the FBI Academy in Quantico, VA, I know that dichroism is and has been a part of the fiber examination curriculum and protocols; it is taught early in the instruction and is used throughout the rest of the course. It is a standard topic in books on the subject of microscopy and fiber analysis (the first use of the word was sometime before 1820). The larger point is that Sakevicius and Kilgore should have been aware of dichroism as a concept, known how to check for it, and have a knowledge of what it meant to the evidence. That they did not use the dichroic differences, note them, or mention them in their testimony --moreover, use it to exclude at least the black polyester fibers-- speaks to their level of analytical skill.

Even with the scant materials provided to Mr. Bommarito, he was able to conduct examinations that excluded the questioned fibers from their purported sources using instrumentation of roughly caliber as that used by ASCL at the time of the original examination. The results obtained by Sakevicius and Kilgore formed the basis of their reports and testimony. The current re-analysis demonstrates that those results and interpretations were incorrect. The submitted fiber evidence does not support the original conclusions drawn by Sakevicius and Kilgore in their reports and testimony on these items. Retrospective analysis like this is always difficult and one must be mindful of the methods, the scientists, and the laboratory as contributing or confounding factors.

Mr. Bommarito did an excellent job of analyzing the fiber evidence provided, considering the physical state it was in. He went beyond expectations in seeking external assessment of his analysis by including Goodpaster's analysis and introducing control samples as a cross-check.

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