Quality Forensic & Investigative Services, LLC

PO Box 13
Bolton, Massachusetts 01740

Phone - Forensics: 508-328-3300
Phone - Investigations: 978-870-7999
Fax: 978-779-2990
E-mail: contact@QFISLLC.com
Website: www.QFISLLC.com

May 20, 2013

Marc J. Victor, Esq.
Law Firm of Marc J. Victor, P.C.
3920 S. Alma School Road, Suite 5
Chandler, AZ 85248

RE: State of Arizona Superior Court Case Hogue, et. al. vs. Mark Goudeau, et. al. CV2010-092705, CV2010-099221, CV2012-095372, CV2012-095373, CV2012-095374 (Consolidated). Supplemental Report #1 Concerning Forensic Biology Practices at the Phoenix Police Department Laboratory Services Bureau.

Dear Attorney Victor,

I had the opportunity to hear depositions from Phoenix Police Department Laboratory Services Bureau (PPDLSB) employees Allison Sedowski and Roger Schneider on May 14, 2013 and May 15, 2013 respectively. I also had an opportunity to review documents provided by Defendant's as a result of Plaintiff's Request for Production. The following documents were reviewed, in part:

1) Arizona Department of Public Safety Response to Defendant's Request for Production (COP_HN013953-0016218)
2) Phoenix Police Department Laboratory Services Bureau case file in connection with Mark Goudeau crimes against the Lara sisters (COP_HN013012-013952)
3) Phoenix Police Department Laboratory Services Bureau protocols, including DNA protocols, Serology protocols, CODIS operating procedures, DNA Quality Manuals, Policy B-10 Latent Print Priority Requests, Policy B-6 Requests for Analysis of Physical Evidence, Case Evaluation Policy, DNA Quality Control Index, and Policy & Procedures Manual (COP_HN011950-0129851)
4) Phoenix Police Department Laboratory Services Bureau validation study for the AmpFℓSTR Identifiler PCR Amplification Kit (COP_HN019593-02016)

As a supplement to my original report and my rebuttal report, the following further opinions are provided as a result of information revealed during the depositions and my review of relevant portions of the documents mentioned above:

1. The PPDLSB's failure to initiate the testing of the left breast swab(s), either during initial rounds of selection or in follow-up rounds of DNA testing, is unreasonable and below the standard of care. There was no valid basis for the screener's decision to not select the left breast swab for DNA testing along with the right breast swab. There was no valid reason for not initiating testing on the left breast swabs forthwith after the first round of DNA testing, once the PPDLSB did not obtain the perpetrator's DNA STR profile from the right breast swab(s) and labia swab. Failure by the PPDLSB to initiate DNA testing on the left breast swabs was unreasonable and below the standard of care.
    a. The Phoenix Police Department investigators had submitted a Priority Request form to the PPDLSB for the analysis of evidence in this case in September 2005, which indicates that the case was a high priority.
    b. The PPDLSB did not have a mandate or policy restricting the number of samples that screeners could forward for DNA analysis in a first round of testing. There was no valid reason for the screener to only send three samples for DNA analysis, withhold the left breast swabs, and not select them for testing along with the right breast swab(s). Her actions were unreasonable and below the standard of care in the processing of this high priority evidence.
    c. The screener's judgment in deciding that the right breast swab was a better sample for DNA analysis and was more probative than the left breast swab has no basis.
        i. Based on the case scenario and the screener's knowledge of the case scenario, the left breast swabs were equally probative if not more probative than the right breast swabs. The screener had knowledge that her selection of a sample for DNA analysis meant that it would be tested, and likewise that by not selecting a sample for DNA analysis there was no assurance that it would be DNA tested. Failure to recognize the probative nature of both the left and right breast swabs and the failure to ensure that the left breast swabs were subjected to DNA testing was unreasonable and below the standard of care in the analysis of this high priority case.
        ii. The left breast swabs and the right breast swabs in this case are separate samples, collected from different bodily areas and equally probative, and it is not appropriate to select one as a predictor of what will be contained on the other. Failure to recognize this and failure to ensure that both samples are subjected to DNA testing was unreasonable and below the standard of care in the analysis of this high priority case.
        iii. As was explained in the depositions, the amount of nucleated cellular material seen on a breast swab is not predictive of the value of DNA results that will be obtained from the sample. The only way to know whether a sample whose scenario indicates it likely contains probative DNA actually does contain probative DNA is to subject it to DNA analysis, and such DNA analysis was never initiated at PPDLSB on the left breast swabs. Failure to recognize this and failure to ensure the DNA testing of the left breast swabs was unreasonable and below the standard of care in this high priority case.

iv. The presence of dirt on a sample is not reason to withhold a probative sample from DNA analysis and is reason to analyze the probative sample sooner rather than later, especially when case scenario information indicates that the dirt was applied in an apparent attempt to mask the perpetrator's DNA. Failure to recognize that a probative sample can be successfully subjected to DNA analysis even if it is soiled with dirt, and that the presence of dirt is not reason to withhold from selection a probative sample, was unreasonable and below the standard of care in the analysis of this high priority case.

v. If the screener required clarification on the probative value of the samples it was her duty to obtain that clarifying information from investigators before making the unilateral decision to not select the left breast swabs for DNA analysis, which caused the probative left breast swabs to sit untested at the PPDLSB and impeded the identification of the perpetrator. Failure to initiate such communication was unreasonable and below the standard of care in the analysis of evidence in this high priority case.

1. In cases where the investigators have completed a Priority Request form, it was revealed in the depositions that supervisors assess such high priority cases and assign them to analysts. It is common and probably expected that supervisors or analysts contact investigators, particularly in high priority cases, to glean background information about the case to aid in the PPDLSB's analysis of the evidence. Neither the PPDLSB forensic biology supervisors nor analysts contacted investigators in September 2005 to obtain information about this high priority case. Failure to act on this and failure to communicate with investigators in this high priority case to make informed decisions about the selection of samples for DNA testing was unreasonable and below the standard of care in the analysis of the evidence in this high priority case.

d. The screener did not select the left breast swabs for testing in the first round of DNA analysis, nor did she follow-up at any time to determine the results from the first round of DNA analysis and whether the left breast swabs warranted testing based on results from the first round of DNA testing. Even when the screener was preparing to examine underwear from the very same case in February 2006 and was accessing the case information in the PPDLSB's Laboratory Information Management System (LIMS) which contained information about the DNA results of the first round, she did not follow-up on the DNA results of the previous samples she had selected for DNA analysis or check to see if the left breast swabs had been DNA tested. Being the CODIS Administrator, the screener has an understanding of DNA results and would have been able to understand DNA information about the samples sufficiently to follow-up on the left breast swabs of this high priority case to which she was assigned. Since she selected the right breast swabs for DNA testing first in this high priority case, then her decision to not follow-up and ensure that the left breast swabs got tested once the right breast swabs did not reveal the perpetrator's DNA profile was unreasonable and

below the standard of care in this high priority case. The fact that at least one of her supervisors, who would have reviewed the Priority Request form and been aware of this high priority case, did not follow-up on the case was unreasonable and below the standard of care in this high priority case.

   i. The depositions revealed conflicting information about the responsibility to follow-up on subsequent rounds of DNA testing when only some samples were selected for first round testing. The PPDLSB had no system whereby samples suitable for subsequent rounds of analysis were evaluated and DNA testing initiated. Because the PPDLSB apparently allows screeners to select some but not all probative samples for DNA testing, in order to perform effective and judicious work on cases it is necessary to have a system of checking what else remains in storage to be tested when the first round of DNA testing does not reveal probative information. The failure by the PPDLSB of not having a system to evaluate samples remaining to be DNA tested and to initiate DNA testing on probative samples that have been screened but have not yet been DNA tested is unreasonable, below the standard of care, and ultimately had dire consequences in this high priority case.

2. There are deficiencies in both system and individual areas related to critical thinking skills that were applied in this case. There was no training, policy, or proficiency testing that covers critical thinking skills as they apply to the selection of samples for DNA analysis. The screener's ability to apply sound judgment towards making appropriate decisions about prioritizing and selecting samples for DNA analysis in this high priority sexual assault case was deficient, unreasonable, and below the standard of care. The lack of a system within the PPDLSB to assess these critical thinking skills in screeners was unreasonable and resulted in the ineffective analysis of evidence from this case by the PPDLSB.

3. According to testimony at the deposition, a supervisor reviews Priority Requests before assigning the cases to DNA analysts. A supervisor would have reviewed the Priority Request of this high priority case before the PPDLSB DNA analyst was assigned the case. There is no indication that a supervisor assessed the samples selected for DNA testing by the screener or followed-up on the DNA results of this priority case in order to ensure that all probative samples available to be DNA tested were subjected to DNA testing. This is unreasonable and below the standard of care in the analysis of this high priority case.

4. According to testimony at the deposition, the PPDLSB DNA analyst working on the Lara case showed a supervisor, Mr. Schneider, a DNA electropherogram from the labia swab while processing the case. The electropherogram indicated the presence of DNA from two females (one being the victim) and a low level male contributor. Mr. Schneider advised the DNA analyst to follow-up on the DNA results from the second female contributor. He provided no advice to the DNA analyst concerning the obvious probative results indicative of the perpetrator's DNA being present on this sample; he provided no instruction on how to glean more information about those results nor advice about the importance of the finding of male DNA on the

labia swab from a sexual assault victim who claimed that the perpetrator had oral contact with her external genital area. He apparently did not inquire further about other probative samples that were not selected for DNA analysis by the screener, and did not follow-up on the DNA analyst's interpretation of the data from the sample, which failed to notify detectives about probative DNA results. This lack of supervision and deficient supervisory input into this sample and this high priority case was unreasonable and below the standard of care in the analysis of evidence from this case.

In Mr. Schneider's deposition, he stated that had the PPDLSB tested the left breast swabs that he did not believe that they would have obtained a result on the left breast swabs sufficient to search the perpetrator's STR DNA result in CODIS. I disagree with that assessment. It is my opinion that a competent DNA analyst using the PPDLSB DNA protocols effective in 2005 would have obtained STR DNA results of the minor male contributor on the left breast swabs sufficient to search the results in the local or statewide CODIS DNA database.

5. The PPDLSB DNA protocol effective 04/18/2005 would allow a competent DNA analyst to assess and test the left breast swabs in a manner that would maximize the laboratory's ability to obtain an STR result from a minor male contributor. The capitalized headings in the paragraphs that follow indicate the skills, considerations, or steps of the process that in my opinion would have been used by a competent DNA analyst at the PPDLSB to analyze the left breast swabs. Further information about the testing of other swabs from this case at the PPDLSB are included.
    a. CRITICAL THINKING: A competent DNA analyst would recognize that given the scenario where an unknown male perpetrator had oral contact with a female sexual assault victim's breasts that saliva from the perpetrator would be transferred to the victim's breasts. If the perpetrator fondled the victim's breasts, additional DNA from the skin of the perpetrator would be transferred to the breasts. A competent DNA analyst would recognize that swabs collected from the breasts would contain saliva from the unknown perpetrator, that saliva contains DNA from epithelial cells, and that the objective in conducting DNA testing on the swabs is to obtain STR DNA results from the perpetrator sufficient to search them in the DNA database, CODIS. A competent DNA analyst would recognize that in addition to DNA from the perpetrator's saliva and skin, there is going to be DNA from the victim's own skin on the swabs collected from the breasts. A competent DNA analyst would realize that on the breast swabs the relative amount of male DNA from the saliva and skin is expected to be less than the amount of female DNA from the victim's own skin. Because of this, a competent DNA analyst would realize the importance of using the most sensitive and informative tools at his/her disposal in order to obtain usable STR DNA results from the expected minor male DNA on the evidence.
    b. CRITICAL THINKING AND CONSUMPTION: Following a visual examination of the swabs, the first step of the DNA analysis process is to extract the DNA from the swabs. A competent DNA analyst would realize that the collection of swabs from body surfaces results in a non-homogenous distribution of sample on the swab. The amount of DNA varies from region to region on the

swab. In situations where there is an abundance of DNA on the swab, this variation is not critical to obtaining a usable DNA result. But in the situation where it is expected that the amount of DNA from the perpetrator is low and probably not distributed evenly on the breast nor on the swabs used to collect the sample from the breast, it would behoove a competent DNA analyst to request authorization to consume the entire sample in order to obtain a homogenous representation of the DNA present in the sample.

i. CONSUMPTION IN STAGES: Alternatively, if a DNA analyst chooses to attempt DNA analysis on half of the total sample but determines at a later step in the DNA analysis process that insufficient DNA is present in the DNA extract, a competent DNA analyst would recognize that additional swab material could be extracted and the DNA from that extract added to the first extract in order to obtain a more homogenous representation of the DNA on the swabs. A competent DNA analyst would thus initiate steps to obtain authorization for the consumption of the swab material remaining that could be tested.

ii. CONCENTRATION OF DNA EXTRACT: At the PPDLSB, the standard volume of DNA extract obtained from the DNA extraction process for evidence samples such as breast swabs is 40 microliters. The final volume of DNA extract is dependent on the DNA analyst's use of the device called a Microcon used to concentrate DNA extracts. A smaller volume of DNA extract would contain a more concentrated amount of DNA. A more concentrated DNA extract (e.g., obtaining a smaller final volume of DNA extract) would be important if a 40 microliter DNA extract does not contain an abundance of DNA and the DNA analyst is to maximize the potential to detect a minor male contributor on a sample such as breast swabs. A competent DNA analyst would recognize the importance of this issue and would use tools at his/her disposal such as a Microcon to maximize the potential of obtaining usable STR DNA results from the male perpetrator whose DNA is expected to be present at a relatively low amount compared to the victim's own DNA.

c. DNA QUANTIFICATION: Once the DNA is extracted from the swabs, the amount of DNA in the DNA extract is determined by a process called quantification. The name of the commercial kit used for this process is Quantifiler. There is a Quantifiler kit that can determine the amount of total human DNA in a sample, and a Quantifiler kit that can determine the amount of male DNA in a sample. Both kits were in use at the PPDLSB in 2005 when the case at issue was and would have been analyzed.

i. CHOICE OF DNA QUANTIFICATION PROCEDURE: Breast swabs expected to contain a relatively low amount of male DNA compared to the female DNA in the sample are exactly the sort of sample that should be subjected to the Quantifiler procedure for determining the amount of male DNA in a sample. A competent DNA analyst would conduct both Quantifiler tests and determine the amount of male DNA and the amount of total human DNA in the sample. This will yield important information for the DNA analyst and will guide the competent DNA analyst in the next stages of the DNA analysis process. This

information will allow the competent DNA analyst to assess how much DNA should be used in the next step - called PCR or Amplification - in order to expect to see the male perpetrator's STR DNA results. The competent DNA analyst will attempt to achieve a balance to maximize the amount of male DNA introduced to the analytical process while maintaining a reasonable amount of total DNA introduced to the system. If sufficient DNA extract exists, it may be necessary for the competent DNA analyst to make several attempts using different amounts of DNA extract in order to obtain the most STR DNA information about the male perpetrator's DNA.

1. The PPDLSB DNA analyst who analyzed the swabs from this case used only the Quantifiler kit that determined the total amount of human DNA. The DNA analyst did not use the Quantifiler kit that would have revealed to her the amount of male DNA in the sample. According to the DNA protocol in effect in 2005, the use of the Quantifler kit for male DNA was a tool available to the DNA analyst but she did not use it for the samples that were tested in this case. The fact that she did not use both Quantifiler kits for these samples - when they were available to her and she should have known that the objective was to detect saliva from a male perpetrator on a female's breast - was unreasonable and below the standard of care in the analysis of this high priority case.
2. Despite that the DNA analyst did not use the Quantifiler kit that would have revealed to her the amount of male DNA on the portions of swabs that she tested, the DNA analyst obtained some information about this during a subsequent step of the analytical process. For example, the electropherograms from the labia swab revealed an indication of a male DNA at a low level as well as results at STR loci showing a consistent amount of DNA as the male contributor. The DNA analyst could have used this information to attempt additional DNA tests using more DNA from the labia swab DNA extract to obtain more information about the DNA profile of the male perpetrator. The fact that she did not attempt to use more DNA in additional PCR amplifications to analyze the labia swab sample was unreasonable and below the standard of care. (See additional opinions about the DNA analyst's work on electropherograms from the labia swab in future sections).
    a. The DNA analyst had achieved a 40 microliter volume of DNA extract from the labia swab. The DNA analyst used a total of 2 microliters for testing (1 microliter for the one Quantifiler test and 1 microliter for the PCR Amplification step of the DNA analysis process). A volume of 38 microliters of additional DNA extract was available that the DNA analyst could have used to attempt additional tests using more DNA.
    b. At any time following her first attempt at STR testing, the

DNA analyst could have conducted the Quantifiler test to determine the amount of male DNA present in the sample. Ample DNA extract remained from all the samples that she tested in this case, and the Quantifiler test required only 1 microliter of DNA extract. There was ample DNA extract for the DNA analyst to conduct this test to better assess the amount of male DNA in the samples.

d. PCR AMPLIFICATION: A competent DNA analyst would use the information from the Quantifiler tests and, if available, information from previous attempts at PCR Amplification and DNA typing to maximize the potential for obtaining a DNA result from the male perpetrator. A competent DNA analyst would use the relative amounts of male DNA and human DNA present in the sample to attempt to achieve a balance that will allow the DNA analyst to successfully obtain DNA STR results from the male contributor. A competent DNA analyst would use the most sensitive method available to maximize the potential for obtaining STR results from the male perpetrator. Validation studies conducted by the laboratory on the PCR amplification kit used would help guide the competent DNA analyst in achieving this goal.
    i. The PPDLSB used the Identifiler DNA testing kit to obtain STR DNA results on samples. The PPDLSB had conducted validation studies on this kit and had a DNA protocol in effect in 2005. The DNA protocol guided DNA analysts to use what is commonly called a "half reaction" method for testing with the Identifiler kit components. The PPDLSB had validated the Identifiler kit using half of the volumes of reaction ingredients indicated by the manufacturer, which is not uncommon for crime labs to do. The use of a "half reaction" increases the sensitivity of the test, allowing the laboratory to detect lower amounts of DNA than the manufacturer states, which is particularly useful for mixtures. The manufacturer of the Identifiler kit indicates that it is able to detect mixtures at a ratio of 1:10 (i.e., a minor contributor of 10% of the total DNA in the sample) using the "full reaction" method, while the PPDLSB validation study indicates that it can detect mixtures to a ratio of 1:20 (i.e., a minor contributor of 5% of the total DNA in a sample). The PPDLSB did not validate the "full reaction" method for the detection of minor contributors beyond a ratio of 1:5, however data in the case at issue demonstrates that the PPDLSB can detect DNA from a minor male contributor better than the ratio stated by the manufacturer. The use of the "half reaction" would best allow a DNA analyst to detect low amounts of DNA, which is an important tool to have when analyzing samples from a female victim's body that contain saliva from a male perpetrator.
    ii. Electropherograms and data available in the case files from PPDLSB and the Arizona Department of Public Safety (AZ DPS) indicate the relative amounts of male DNA present in the DNA extracts of swabs from this case and also indicate the relative ratios of DNA between the male contributor and the two sisters for the labia swab and the left breast swabs DNA extracts.

1. PPDLSB records show a low amount of DNA from a male contributor on the labia swab, and that the amount of male DNA present is approximately 4% of the total DNA in the sample. The sample is consistent with being a mixture of DNA from the two Lara sisters and the perpetrator. There is an approximate equal amount of DNA from each female Lara sister in the labia swab sample, resulting in a ratio of DNA between the male perpetrator's DNA and the sisters' DNA of approximately 1:12:12. If the "half reaction" method of PCR amplification were used, the amount of male DNA is within the range that would yield STR results as long as sufficient male DNA were introduced to the reaction.
2. Though the PPDLSB did not use the Quantifiler kit to determine the amount of male DNA in the labia swab sample, they did have information from the labia swab electropherograms and could have used that information to introduce more DNA into a subsequent PCR amplification reaction after their first attempt at PCR amplification. The DNA protocol in effect in 2005 contains appropriate latitude to allow DNA analysts to amplify more DNA if necessary, but if desired the DNA analyst could also have consulted with her Technical Manager and gained approval to amplify more DNA than her first attempt and take necessary steps to glean further STR information from this high priority case. Amplifying an additional amount of DNA is acceptable according to the DNA protocol, as is performing additional PCR amplifications in order to report STR results for low level samples. The PPDLSB DNA analyst did not do any follow-up on the minor male contributor in the labia swab sample revealed by her STR tests and did not conduct any additional PCR amplifications, which was unreasonable and below the standard of care for this high priority case. (Also see later section concerning thresholds and reporting results).
3. The AZ DPS records show that the left breast swabs contained approximately 8% male DNA. This is twice the amount of male DNA than was present in the labia swab sample analyzed by PPDLSB. PPDLSB saw indications of the male contributor in the labia swab at a level of 4%, and they surely would have been able to obtain an STR result from the male perpetrator at a level of 8%. The left breast swabs contained a mixture of DNA consistent with a male perpetrator and the two female sisters with a ratio of approximately 1:2:7. As long as sufficient DNA was introduced into the PCR amplification reaction, this ratio is within the range that would have yielded STR results of the male perpetrator by the PPDLSB whether they used a full reaction method or their approved half reaction method for the Identifiler kit.

iii. When analyzing the swabs from the case at issue, the PPDLSB DNA analyst did not use the "half reaction" method from the PPDLSB

approved DNA protocol for PCR amplification of these samples. The PPDLSB analyst used the less sensitive 'full reaction" method, and did not obtain callable STR results for the male perpetrator from the samples she tested.

1. Even though she used this less sensitive method, the DNA analyst still obtained information about the presence of a low level male contributor on the labia swab. The DNA analyst had ample DNA extract remaining that she could have attempted additional PCR amplifications using the "half reaction" and also could have attempted additional PCR amplifications using more DNA to obtain additional STR information about the male perpetrator. She did not do either of these, which was unreasonable and below the standard of care in the analysis of this evidence.
2. The DNA analyst could also have used the "half reaction" method to conduct additional PCR amplifications on the right breast swabs when her first attempt did not yield probative results. When she tested the right breast swab, she had introduced 0.7 nanograms of DNA into the PCR amplification which is half of the amount of DNA that she used for the other samples that she tested in this case. By introducing a lesser amount of total DNA into the reaction to begin with, the PPDLSB DNA analyst virtually assured that she would not detect a very low level male contributor in this sample. As follow-up to her first attempt, she could have obtained authorization to consume the remaining portions of the right breast swab, she could have concentrated the right breast swab extracts using a Microcon, she could have conducted a Quantifiler test to determine the amount of male DNA in the extract, she could have introduced more DNA than 0.7 nanograms into the PCR reaction, and she could have used the "half reaction" Identifiler method to analyze the right breast swabs extract. She would still have had DNA extract remaining to conduct Y-STR tests at a later date, if necessary. She did not do any of these, nor did she attempt any such analysis on the left breast swabs, which was unreasonable and below the standard of care in the analysis of evidence from this case.

e. CAPILLARY ELECTROPHORESIS AND DATA INTERPRETATION: The PPDLSB used an instrument called a genetic analyzer to view results of the PCR amplification. The PPDLSB DNA protocol effective in 2005 allowed for samples to be injected onto the genetic analyzer at various injection times from 1 second to 9 seconds, depending on the sample. Longer injection times allow for more DNA to be introduced to the genetic analyzer, which in this case would have the effect of increasing the potential to obtain STR results from a minor male contributor. A competent DNA analyst would use the injection times of the genetic analyzer as a tool to obtain the most information from a sample having a low amount of male DNA compared to the female DNA in the sample. In this case, the DNA analyst reported data from

the labia swab from an injection time of 2 seconds and ignored data from a 5 second injection.

i. The 2 second injection revealed a "Y" allele at the Amelogenin locus, indicative of the presence of male DNA. The height of the peak was 57 Relative Fluorescent Units (RFU), which is above the PPDLSB's "Peak Amplitude Threshold" (PAT) of 50 RFU required to differentiate allele results from instrument background noise. The PPDLSB DNA analyst did not include this result in her report and her report did not indicate the presence of male DNA in the labia sample. The 2 second injection also revealed peaks above 50 RFU at two other loci in the sample, a clear indication that there was a third contributor to this sample besides the two Lara sisters.

    1. The PPDLSB DNA protocol effective in 2005 describes that making an allele call for a peak with a height between 50 RFU and 75 RFU is up to the analyst's discretion. Since at the gender identifying locus Amelogenin there are only two options for results - an "X" and a "Y" - a competent DNA analyst seeing a "Y" result at 57 RFU would report the indication of male DNA being present. Consensus guidelines from the Scientific Working Group on DNA Analysis Methods (SWGDAM) (listed as a reference in my first report) acknowledge that results at the Amelogenin locus indicating a low level male contributor can be reported even if the peak height of the "Y" allele does not meet a reporting threshold. Had this result been reported (both verbally and in the written reports), the investigators would have been alerted to the presence of male DNA in the sample as early as December 2005. The fact that PPDLSB did not report the presence of male DNA in the labia swab was unreasonable and below the standard of care in the analysis of evidence in this high priority case.
    2. The PPDLSB has a general requirement for homozygote results to reach a peak height of 200 RFUs and heterozygote results to reach a peak height of 100 RFUs in order to be reported. The DNA protocol describes how peak heights can be increased by subjecting the sample to longer injection times on the genetic analyzer. It also describes how peaks below these stated thresholds can be reported if the sample is re-amplified and the allele in question is concordant in the two testing attempts. The PPDLSB DNA analyst did not subject the labia swab to a second PCR amplification - at either the same input DNA amount, or more input DNA, or using the "half reaction" method, or using the "full reaction" method. The PPDLSB DNA analyst made no attempt to obtain more information about the STR DNA profile of the male contributor beyond what she saw in the 2 second injection of the labia swab. Her failure to use these additional tools at her disposal, was beyond unreasonable and was far below the standard of care in the analysis of the evidence from this high priority case.

ii. The PPDLSB DNA analyst had also injected the labia swab sample at 5 seconds but did not report any results from this injection time. Her notations in the case file indicate that this sample was "OS" which means off-scale.
    1. The impact of being off-scale can have an effect on STR loci because it can effect otherwise reproducible artifacts, however there is no such impact of being off-scale at the gender identifying locus called Amelogenin. Off-scale data at the Amelogenin locus will impact the use of the locus for estimating relative amounts of DNA from a male contributor but off-scale data does not falsely introduce a male DNA result when none exists in the sample. Off-scale data at the Amelogenin locus can still be used to assess the presence of male DNA in the sample.
        a. The PPDLSB DNA protocol in effect in 2005 instructs DNA analysts to dilute samples or re-inject them at a lesser injection time if the sample is off-scale at loci other than Amelogenin. This instruction indicates that results at the Amelogenin locus can be used even if the peak(s) at this locus are off-scale. The data from the 5 second injection of the labia swab sample revealed a "Y" allele, which is indicative of male DNA, at a peak height of 153 RFU. This result was at a peak height that, had it been used by the PPDLSB DNA analyst, it would have been included in the DNA reports and the investigators would have been alerted to the presence of male DNA as early as December 2005.
    2. The 5 second injection data was not off-scale at all loci. There were many loci whose data was not off-scale. A competent analyst would inject a sample with low level male contributor at several different injection times in order to maximize the information that can be gleaned from each locus to the fullest extent of the genetic analyzer's capability. By not using appropriate scientific discretion in her analysis of the genetic analyzer injections of the labia swab sample from this high priority case, the PPDLSB DNA analyst's work was unreasonable and below the standard of care in the analysis of this evidence.
        a. The 5 second injection of the labia swab increased peak heights from the minor contributor to the point where alleles from the perpetrator could have been reported. If the labia swab had been injected at 9 seconds, even more minor alleles would have been revealed at other loci that were not off-scale. Analyzing the sample in this fashion, coupled with re-amplifying and using the "half reaction" method, would probably have resulted in the reporting of minor alleles from at least 6 loci, which would have been sufficient to search in CODIS.

6. By applying the PPDLSB protocols in effect in 2005 and by using appropriate critical thinking skills, a competent DNA analyst would have obtained STR results on the left breast swabs had they tested them in 2005.

Sincerely,

Mary Kate McGilvray

Mary Kate McGilvray
Forensic DNA Consultant
Quality Forensic and Investigative Services, LLC