Janine Arvizu – Cross-Examination Questions

State v. Scott Wheel, Volusia County – Post Conviction Relief 3.850 Motion Hearing
(Arvizu attack on blood sample not collected/tested properly)

Garett M. Berman, Florida TSRP

- How was your opinion communicated to the defendant?
- Physically inspect evidence in this case?
- Visit the laboratory at which this analysis was performed?
- Discuss findings with any other:
    - Chemists?
    - Analysts?
    - Lab auditors?
- Did not finish dissertation
- Rely on the relevant national and international standards applicable for any given situation for testing
- Never worked in a laboratory whose primary purpose was forensic testing
- Never done any blood alcohol testing personally
    - Penn v. Johnson, January 23-24, 2014; p 147, l3
        - See Monday Morning quarterback analogy
- You really "didn't do a lot of bench work," correct? Pennsylvania, p149, l4-5
    - "did not do a lot of hands-on testing", id at l14-17
- Not taken any classes in forensics; only attended conferences
- Not a forensic chemist
- No such things as an ISO Lead Auditor, per se
    - Gathers data before conducting on site visit
    - So would the data audit just be the first step in the entire auditing process?
    - Review testimony and documents
        - When?
        - Take notes?
            - Shouldn't she take notes about everything so she doesn't have to rely on memory
    - "It wouldn't be a full ISO audit if I couldn't go onsite and look at all the operations" Vermont, p119, l19-20
        - *So she cannot do a full audit; this is only a partial audit*
        - Possible that going on site could answer any outstanding questions she has?
    - Same thing with ASQ audit
- Consulting in defense cases is 100% defense, correct?
    -

- Opinion:
    - The efficacy of the lab systems for ensuring the reliability of the result

- Fact that the laboratory system was deficient in a number of areas necessary to ensure the reliability of the result

- Three general areas she looks at:
  - 1 – Sample integrity
    - Whether or not all of the necessary controls were put into place to ensure the integrity of the sample from the point of collection through the point of reporting the results
      - Collection of the blood
        - When was sample collected
        - Tube designed for use in blood alcohol testing?
          - Manufacturer?
        - Tube contained 1% sodium fluoride and anticoagulant?
        - Was color of additives checked before introducing sample into tube?
        - Packaging indicates that:
          - all preservatives and anticoagulants are clear and colorless, except CTAD which is yellow
            - Do not use if they are discolored or contain precipitates
          - Powdered additives such as heparin and thrombin are white
          - Fluoride and fluoride/oxalate may be pale pink
            - Do not use if color has changed
          - EDTA spray coated additives may have a white to slightly yellow appearance; this does not affect the performance of the EDTA additive
          - Do not use tubes after expiration dates
          - Tubes expire on the last day of the month and year indicated
            - Any studies that show that discolored additives affect the analysis?
            - How much color variation?
            - Absent any evidence that the blood collection tube integrity was breached, and the tube or kit not yet expired, is it still necessary to check the color of the additives?
            - Assuming that it was not checked, can you tell the court with any specificity that the blood results in this case were affected?
        - Tube sealed?
          - Demonstrate its integrity had been protected between collection and testing
        - Was there a bag that the tube was placed in?
          - If so, was it sealed properly?

        - Recorded temperature of the sample when it was stored?
            - *Temperature and preservation are two of the major factors that the literature has demonstrated are necessary to protect the integrity of the sample

- Controls:
    - "A calibration is how we teach the instrument what something should be. Controls are how we measure whether or not the instrument system is getting the right answer essentially on any given batch. So first we teach it using calibrators, and then we check it using control samples." Brent, p89, l19-24

- Are the controls samples made differently from the calibrators?
    - What's the difference?
- Under filling of tubes?
    - Manufacturer (Becton Dickinson) materials says that an under-filled tube can lead to poor product performance and inaccurate results
        - According to Becton-Dickinson blood tube manual, caution section states:
            - Actually says "overfilling or under-filling of tubes will result in an incorrect blood-to-additive ratio and may lead to incorrect analytic results or poor product performance"
                - Not just under-filling, but overfilling
                - According to Arvizu, you would need to fill it exactly to a certain amount to comply with the manufacturers strict guidelines
                    - Can't be over or under then!
                - So what the exact amount?
                    - Anything less than 9.7 milliliters is under filled?
                - What's the maximum amount, then?
- How would that affect the analysis?
    - What study shows that overfilled or under-filled blood tubes, or an incorrect preservative/anticoagulant to blood ration, will results in a false elevation in ethanol analysis?
- Any indication that the tubes in this case were not stored between 39 F and 77 F degrees?
    -

- 2 – Method validity
    - The day-to-day quality control practices in the laboratory are relevant as to whether or not all the aspects of the measurement system was appropriately controlled at the time the measurement was made

        - She does not dispute the underlying validity of gas chromatography, specifically headspace GC
    - Whether or not the laboratory used a testing method that had been scientifically validated and found to be appropriate for its intended use
        - Required by standards – not optional
    - Validation study for the GC used?
        - Raw data?
        - Summary report with conclusions?
        - What was done during this validation study?
    - Was the selectivity of the instrumental method used (e.g., the ability to conclusively distinguish ethanol from other potentially interfering volatile organic compounds) demonstrated?
        - Co-elution or an overlap of the ethanol peak and internal standards peak, when acetone was present in the sample?

- 3 – Application of the method / reliable performance of the method
    - Was the instrument calibrated on the day they tested the sample?
        - How often was the instrument calibrated?
            - Were calibrators run with every batch of samples?
        - How was it calibrated?
    - Did the lab prepare their own calibration standards or purchase them from another source?
        - If purchased, who was the source?
        - What did they purchase?
            - Ethanol stock solution?
            - Ethanol reference source?
        - If the lab prepared it, how was it prepared?
            - Absolute ethanol (200 proof)?
                - Was it expired?
                - What was expiration date?
            - Is it normal to start with a high concentration of a solution and prepare subsequent dilutions from that?
                - "it is an appropriate and necessary practice"
            - Assuming you take a known standard and, based on training and experience, it's diluted to a known value, and then confirmed to be that value with an uncertainty to tolerances for the testing method as established under ISO standards, is there any published peer-reviewed materials that say that the methodology is improper?
        - Arvizu was not present when the standards were prepared?
            - Not been to lab
            - Not inspected the samples
            - Not inspected the standards
            - Not inspected the instruments

- Peer-Reviewed articles or studies that say that you cannot consider the blood test to be reliable if:
    - Blood drawn into tube that hasn't had color of preservative checked?
    - Bag must be sealed in a specific way or not?
    - Sample temperature has not been recorded?
    - When sample was collected was not recorded?
    - When calibration was not done on day sample was tested?
    - When lab did or did not prep their own standards?
    - Studies that say that following ASCLD/LAB protocols/procedures
    - Visual inspection of the tube is required in the absence of any suspicion that the tube's integrity has been violated?
    - The blood is not tested within 48 hours of the time it's drawn and not kept at room temperature?
        - That the result is invalid?
        - Or how it is affected?
        - Aside from speculation that there could be a problem on the basis of no empirical evidence

- Does Arvizu have any evidence to suggest that:
    - The vacuum integrity of the sample tube was affected?
    - There is any basis that sample was mis-colored?
    -

- NCCLS (National Committee on Clinical Laboratory Standards)
    - Officially changed its name to Clinical and Laboratory Standards Institute in 2005
    - She discussed this in the Brent case
    - National guideline for sample collection, collection of blood samples from humans
        - The standard notes the study from Blume and Lakatua
            - Blume/Lakatua study
                - dealt with blood drawn from dead individuals
                - "Post-mortem blood specimen contaminated with a variety of microorganisms was noted to contain increasing ethanol concentrations upon standing."
                - "The specimen, when received, was viscous and malodorous."
                    - Was such the case in this case?
                    - Nothing was noted that the sample was viscous and malodorous, correct?
                    - Is it common to note when samples are <u>not</u> viscous or malodorous?
                        - That's how they should be correct?
                - "While this specimen would not be acceptable for the determination of ethanol, we chose to study it nonetheless."
                - "In a contaminated specimen, <u>of post-mortem blood</u>, the ethanol concentration increased even during refrigeration."

        - Under the conditions of that experiment, fluoride was ineffective in preventing significant production of ethanol by Candida Albicans
- Chang/Kollman study
    - Half of the blood pool in the study was inoculated with Candida Albicans; the concentration was selected from a prior study where the organism was cultured to assess optimum growth
    - "Room temperature storage of all specimens gave negligible or no ethanol formation until Day 5, and even under those conditions specimens that were not inoculated and contained fluoride formed no alcohol over a period of 35 days."
    - "Under refrigerated storage, none of the specimens showed any evidence of fermentation during the first 35 days, and only traces of alcohol were found after 6 months."
    - "It appears that fermentation proceeds readily only by direct inoculation or contamination with candida albicans."
    - "Even in such specimens, the ighest concentration of ethanol attained was 0.007%."
    - "Our study further showed that even when specimens were purposely inoculated with Candida Albicans, no alcohol formation took place for 69 hours at 37C if sodium fluoride at 10mg/mL of blood was used as a preservative."
    - "Therefore, it appears that legal questions regarding the issue of neoformation of ethyl alcohol should be rendered moot if preservatives and short transport times are routinely used in brining specimens to the laboratory and refrigeration is used in specimen storage."
- Winek and Paul study
    - "Effect off Short Term Storage Conditions on Alcohol Concentrations in Blood from Living Human Subjects"
    - dealt with samples where contaminants were introduced into the samples (refrigerated and not refrigerated)
    - Nonetheless, the study found that "none of these showed significant gains or losses in concentration."
    - "The average difference between ethanol as measured on the day of collection and the after storage were all within the range of experimental error of the method (+/- 5%)."
    - "From our experiments, we conclude that alcohol analyses of blood obtained sterilely from living humans can be delayed for as long as 14 days without a significant change in alcohol content."
        - "This holds true whether the blood sample is refrigerated or not, or whether a preservative is

added to the sample."

- Other studies:
  - "Long-Term Blood Alcohol Stability in Forensic Antemortem Whole Blood Samples"
    - Tiscione, Vacha, Alford, Yeatman, and Shan
    - After 5.4-10.3 years after first sampling, opened tubes were reanalyzed by the same lab and a different lab
    - "All samples initially positive for ethanol demonstrated a decrease in BAC over time with a statistically significant difference in loss observed based on blood sample volume and whether or not the tube had been previously opened."
    -

- Standards:
  - At the time of this testing, what standards did the FDLE lab apply?
    - ISO?
    - ASCLD/LAB
    - SOFT
  -

- "You don't simply rely on assuming that things are in control and operating within specifications and within criteria." Brent, p13, l5-7

- Her opinion and audit trails:
  - Is quality assurance auditing considered a science?
    - In other words does it follow certain scientific methods in what it does?
  - Agree that your opinion here is a scientific one?
    - Deals with scientific methods?
    - Auditing the lab, making sure their quality control procedures are valid and reliable?
  - You would agree that a lab should document everything?
  - You would agree that you cannot rely on an analyst's memory, correct?
    - So that another person can replicate the results?
    - Because it is scientific as well?
      - "You should never have to rely, ever, on anybody's memory of what they did or their practice at that point in time. All the steps in the measurement process should be documented so that an independent scientist can actually go back and recreate that work if necessary. That's a real foundation premise for the practice of science. We don't rely on anybody's memory. We rely on written records and an audit trail as required by standards to support that kind of determination." Brent, p42, l5-14
  - By that rationale, you would agree that you should have some records of exactly what it is you found or did not find regarding your data audit?
    - So that you are not relying on just your memory?

- The State can see exactly what you did in coming to your opinion, rather than relying on your memory now?
- Do you have any documentation of what you are looking for and what you've found in this case?
- Isn't it imperative that you document your findings as well? Not just do it from memory?
- You wouldn't want to forget something that the lab didn't do correctly, correct?
- And f course, you want to note things that the lab did correctly, right?
- Or what about things the lab did that went above and beyond what was required?
- Do you note that at all, or just the deficiencies?
- Because that's all you're being paid to look at, correct?

- "I don't ever rely on somebody's memory of what we do as opposed to exactly what the records indicate was done." Pennsylvania, p189, l21-23.
- Where are you records?
- What you reviewed?
- When you reviewed it?
- What you compared it to?
- Specific references as to what was wrong and why?\
- Where are your notes?
- From a quality assessment perspective, if the records cannot be found, it is as if they never existed, correct?
- That's from your own article, "Forensic Labs: Shattering the Myth" published in *The Champion*, the magazine of the National Association of Criminal Defense Lawyers, in May 2000 correct?
- So if you didn't document anything that you did, it's as if you didn't really do it, correct?
- Isn't that just applying your auditing requirements to what it is you do?
- Do the quality assessment auditors have anyone to audit them?
- To make sure they are doing their job correctly?
- And reliably?

- Chromatograms
- Calibration?
- Control samples?
- Certificates of analysis for control samples?
- From where?
- Are they an established reference material provider?
- Is there an audit trail for the CoA?
- Were there any small peaks present in the subject's sample that are not present in the CoA?
- If so, why?
- What are they?

        - Arvizu says this is contamination/carryover

- GC used
    - Arvizu has said that the only reason the instrument says a sample is ethanol is because the analyst essentially tells the machine that anything that comes out at this retention time should be identified as ethanol
        - How else would it know what it is the analyst is putting through it, except by comparing it to known standards?
            - Get a known standard from an outside source and compare the unknown to the known
    - Flame ionization detector?
        - A "stupid dectector" Brent, p51, l23
            - Only has single column
    - Confirmation requires a second column

    - The little blips/peaks in the baseline are too early or too late for ethanol

    - "The whole basis of calibration is that the instrument operating conditions have to be exactly the same as when you're running your unknown samples, exactly the same, because otherwise the calibration doesn't apply." Brent, p84, l20-24
        - But isn't testing stock solutions different than testing whole blood?
            - Aren't there going to be other things in the blood that would show up on a GC analysis?
                - For example, when you test for cholesterol, do you expect to see only cholesterol?
                    - Or would you see other things in the blood such as creatine, on something else
                - When testing for drugs, do you expect to see only the drug that you are looking for?
            - So, testing blood, where there could be many different substance in the sample, is different than testing stock solutions?
                - So seeing other peaks in the analysis does necessarily mean there is something wrong, correct?

    - Ever found any lab you have been asked to evaluate to be 100% in adherence with every single rule or standard that would apply?
        - Because you are saying that the rules must be followed, if they are not then the accuracy and reliability of the results is questionable, correct?
            - Thus, in order for any lab to pass your evaluation, and to comply with the international standards you are grading them by, they would have to follow every single rule to the letter?
                - What labs have you been asked to evaluate, in criminal DUI cases, where you have <u>not</u> found any issues?
                    - In any case?
                    - Forensic labs?

        - Have you gone back to the Navy lab that you helped to set up to see if they are still adhering to the procedures that you set up?

    - When she did her study, did she include procedures for checking the blood tubes for the color of additives?
        - Has she ever seen an study on which she has relied that contains that as a requirement?

- Audit Trails
    - When doing a lab assessment, wouldn't you use an audit trail worksheet to document whether certain requirements are met?
        - What questions to address?
        - Document what you reviewed, such as the case file or written procedures?
        - Whether or not you interviewed anyone and who?
        - Whether you made any direct observations or not?
        - And note any comments?
    - Also, wouldn't it be important to note any non-conformities and any comments of those as well?
    - If you are being thorough, wouldn't you want all of that documented?
        - Or is that not required of a quality lab assessor?
-

- How many labs have you been asked to assess or audit from criminal defense attorneys?
    - Of those labs, with how many did you ***not*** find anything wrong with their quality control procedures?
        - Which labs were they?
    - How many labs have you audited through data only, did you ***not*** find anything wrong with their quality control procedures?
        - Which labs were they?
- You recently were hired by Mr. Hyman in a case in Seminole County where you testified about the FDLE labs, correct?
    - When was the analysis in that case conducted?
    - When were you hired on this case?
    - So you had already developed your opinion about the quality procedures of the lab itself before being hired on this case?

- I've seen several reports or affidacit that have been authored by you that states that accreditation by ASCLD/LAB should not be misconstrued as a guarantee of quality; and that accreditation serves as a formal recognition that at the time of the assessment, a third party has determined that the lab had procedures in place that met the Society's requirements?
    - You would still agree with that statement, correct?

- So, your completion of the course for being a Lead Auditor for assessors of laboratory quality systems, certificated by the International Register for Certified Auditors, only serves to show that at that time you met the minimum requirements for passing that course, correct?
    - Are there any CLE's required for being a Lead Auditor?
        - Then who ensures that you are still competent at doing what you claim to do in your field of expertise?

From Mazek

FDLE Testing 2008

Measurement Uncertainty

- Not required by ASCLD/LAB at that point; only after
- FDLE was not always ISO accredited
    - But since it has been offered, FDLE labs have always had it

Samples collection/storage

- CLA does not take not of the date of manufacture of the sample
- Vial used was a Betcon Dickinson
- Tube was sealed with tape
    - White tape in a white box
- Seal was broken on one end of the tube (A tube)
- B tube is still sealed (or should be)

FDLE-Toxicology Evidence Inventory Form

- Case file #4, page 18
- Packaging
    - ME = manila envelope
    - BAK = blood alcohol kit
    - TT = TriTec
    - GSV – Gray stopper vials (2)
        - Size = 10mL
        - Sealed with tape
        - NaF/Oxal additives present by manufacturer
- 11/16/08 at 3:00a – blood specimen collected
- 11/24/08 – analysis started by Mazek (8 days later)
- 12/1/08 - Δ vials tested by Mazek (15 days later) (but always refrigerated)
- 12/09/08 – analysis ended by Marek (23 days later)

Refrigeration of samples

- ASCLD/LAB standard
- Make sure complying with own SOP
    - does not list temperature at which samples are to be refrigerated
        - see studies
            - Blume/Lakatua study
            - Chang/Kollman study
            - Winek and Paul study
            - Tiscione, Vacha, Alford, Yeatman, and Shan

- “Long-Term Blood Alcohol Stability in Forensic Antemortem Whole Blood Samples”

- Evidence Refrigerator Worksheet
    - 11/3/08 – 4.6ºC
    - 12/1/08 – 4.6ºC
    - 1/5/08 – 4.5ºC

Validation Study of GC used by FDLE

- Discuss with Mazek what each part of the summary means
- Runs 20 different VOCs
- Shows no overlap

Selectivity

- SOP runs other VOCs at the same time
- See #19 – FDLE Toxicology Section SOP
    - Where does it state that other VOCs are run at the same time as the sample?
    - What standards?
        - Methanol
        - Isopropanol
        - Acetone
    - Two column retention time
    - Sample agrees in each injection and has reproducible results

Calibration on day of testing

- See #5 – Control Packet
    - Analysis conducted on 12/1/08
    - 5 calibrators used
    - 5 controls – in duplicate
        - To make sure the calibration curve is working
        - 5 in front of sample
        - 5 in back of sample (in reverse order from front samples)
    - Runs 7 (page 14) and 40 (page 15) are the whole blood standard
        - Contains methanol, isopropanol and acetone
    - Calibration curve controls (from Cerriliant):
        - .02
        - .05
        - .10
        - .20
        - .40
    - Air Blank
    - Ethanol Controls (used deionized water) (tests to see if the alcohol curve works)
        - WBC (whole blood control – with methanol, isopropanol, acetone)
        - .025 (+/- 0.050)
        - .080 (+/- 0.050)
        - .300 (+/- 0.150)
    - Runs samples
        - 1 – 10

        - Air Blank
        - 10 – 1
    - Ethanol Controls (tests to ensure alcohol curve still works)
        - .300 (+/- 0.150)
        - .080 (+/- 0.050)
        - .025 (+/- 0.050)
        - WBC (whole blood control – with methanol, isopropanol, acetone)

Internal Standards

- Ethyl Alcohol Whole Blood Control
- See #11 – Whole Blood Control
    - Reagent Code 69-13
        - Prepared 7/25/08
        - Using Fisher Chemical standards
            - No expiration date listed
                - Did not come with Certificate of Assurance

- Obtained from Fisher Chemicals
    - Prior to 2013 Fisher Chemicals did not provide an expiration date on their chemicals
    - According to Fisher Chemicals, chemicals that do not have an expiration date "because those materials should not decompose under normal storage conditions"
        - They should have an indefinite shelf life if they are not contaminated or adulterated
    - If the product has an expiration date listed, then that is the date by which the product should be used
    - If the product does not have an expiration date listed, then the material should be used within 5 years of the manufacture date listed

Chromatograms

- Δ results are vial runs 12 (0.164) and 36 (0.165)
    - **A column = 0.164**
    - B column = 0.165
        - Only reports off the A column
- Peaks at .386 and .453 are air peaks
    - The time it takes something to travel the 30m column and not have any interaction with the column itself
        - ***It would be odd not to see it
    - Should be in all samples
- Peaks at .539 (A) and .653 (B) are in the Δ sample and the whole blood control samples
    - They are not in the standards samples
        - This is because blood samples are not the cleanest of samples
        - There can always be something in a blood sample that is not accounted for
            - However, it CANNOT be mistaken for ethanol

- It eliminates as much as it can

NOTE:

- She's like a Monday morning quarterback. Looking over the playbook and comparing how the plays are supposed to run to how they were run when reviewing the tapes, and noting everything that wasn't run properly. Sometimes the offense scores, even though the plan was not run exactly as it should have been; but that doesn't necessarily affect the fact that the offense scored.

- You only **assume** the results are unreliable because you found the lab protocols and standards insufficient to produce reliable results, correct?
  - That's what you were hired to do, correct?
  - You cannot say, one way or the other, that the results were unreliable, correct?
    - You can only assume based on your review of documents, correct?

- You lack expertise as a forensic chemist
  - And you lack experience performing these types of tests, correct?
- Your expertise is in auditing the procedures and protocols used by labs on a systematic basis, rather than assessing the correct performance of a single test or group of tests, correct?
  - Your testimony, although couched in terms of scientific reliability, pertains to whether CLA Mazek's reports or testimony demonstrated use of adequate laboratory procedure sand protocols in a generalized sense, correct?
  - Your testimony is not that CLA Mazek performed her tests in an unreliable way, just that you were unable to ascertain the reliability of the results based on your opinion that quality assurance procedures employed by CLA Mazek or the lab were insufficient, correct?
    - So basically, what you are saying is that you, yourself, don't have sufficient information (or it is not documented by the lab) to be able to vouch for the reliability of CLA Mazek's results, correct?
      - Not that the results themselves are incorrect, correct?
      - Not that CLA Mazek performed the test incorrectly, correct?
      - Not that CLA Mazek misread the results, correct?