REPORTER'S RECORD
VOLUME 01 OF 01
CAUSE NO. F12-33545-H

THE STATE OF TEXAS	)	IN THE CRIMINAL
VS.	)	DISTRICT COURT #1 OF
JOSHUA PRICE-BRENT	)	DALLAS COUNTY, TEXAS

****

EXCERPTED TESTIMONY OF JANIE ARVIZU

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On the 17th day of January, 2014, the above-styled and numbered cause came on for hearing, and the following proceedings were heard before the Honorable Robert Burns, Judge presiding, held in Dallas, Dallas County, Texas:

Proceedings reported by computerized stenotype machine; Reporter's Record produced by computer-assisted transcription.

CRYSTAL R. JONES, TEXAS CSR #8040
Official Court Reporter
The Criminal District Court
214.653.5903

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C H R O N O L O G I C A L I N D E X

P-R-O-C-E-E-D-I-N-G-S

(January 17, 2014; 9:04 a.m.)

(Open court, defendant & jury present)

THE BAILIFF: All rise.

(Jury ushered in)

THE COURT: All right. Be seated, please.

All right. The State having rested their case, what says the Defense?

MS. GRANT: We're ready, Your Honor.

THE COURT: Call your first witness, please.

MS. GRANT: We call Janine Arvizu.

THE COURT: Come on up and have a seat on the witness stand if you would, please.

MR. MCDONALD: At this time, Your Honor, the State is requesting a 705 Hearing outside the presence of the jury.

THE COURT: All right. That's fine.

Well, I have to take you back out. Would you-all wait in the jury room, please.

THE BAILIFF: All rise.

(Jury ushered out)

THE COURT: Ma'am, you can have a seat. Would you raise your right hand for me, please.

(Witness sworn)

MR. MILNER: As long as I've got them out,

can I go ahead and make my motion?

THE COURT: Go ahead.

MR. MILNER: All right. Comes now the Defendant, Joshua A. Price-Brent, in Cause No. F13-00607. The Defendant, Joshua A. Price-Brent, moves this Honorable Court to instruct this jury to return a verdict of Guilty in that the State has failed to prove --

MS. GRANT: Not Guilty.

THE COURT: Excuse me. You said --

MS. GRANT: You said, Guilty.

MR. MILNER: I apologize.

Correction. And we ask that that be deleted and that I begin over.

The Defendant, Joshua A. Price-Brent, moves this Court to instruct the jury to return a verdict of Not Guilty in that the State of Texas has failed to prove that on or about the 8th day of December, A.D. 2012, in the County of Dallas and State of Texas, did unlawfully then and there operate a motor vehicle in a public place while said Defendant was intoxicated, and by reason of that intoxication did cause the death of Jerry Brown, an individual, by accident, in the State, to wit, by failing to control the said motor vehicle, which said Defendant was operating and which the said individual was a passenger, therefore striking the curb and causing said

motor vehicle to overturn, thereby causing the death of the said individual.

And further, it's presented in and to said Court that a deadly weapon, to wit, a motor vehicle, was used and exhibited during the commission of the aforesaid offense.

THE COURT: The Motion is overruled.

This is about to be an expert witness; is that right?

MS. GRANT: That is correct, Judge.

THE COURT: Okay. Then conduct the 705 Hearing. Go ahead.

(Witness sworn)

JANINE ARVIZU,

having been first duly sworn, testified as follows:

SUB ROSA/705 HEARING

DIRECT EXAMINATION

BY MR. MCDONALD:

Q. Please state your name.

A. Janine Arvizu.

Q. Now, you were retained by the Defendant in this case to conduct a review of the chemistry involved in this case?

A. Yes, the --

THE COURT: Ma'am, would you spell your last

name for the record.

THE WITNESS: Yes, sir. A-R-V, as in Victor, I-Z-U.

THE COURT: And could you please pull that microphone over to you.

THE WITNESS: First name, Janine, J-A-N-I-N-E.

THE COURT: Okay, go ahead.

Q. (BY MR. MCDONALD) Did you complete a report, a written report regarding your findings?

A. No, sir.

Q. How was your opinion communicated to the Defendant?

A. By phone.

Q. Okay. What is the basis of your opinion?

A. The basis for my opinion was a data quality assessment of the records provided to me that supported the forensic results reported by the SWIFS laboratory.

Q. And, specifically, which data sets did you rely on in order to form your opinion, which documents?

A. Okay. I have some of them with me, but it included copies of the laboratory's procedure for blood alcohol determination. It included what's conventionally called a case file that relates to the actual testing of the batch of samples in this particular case. It

included a selection of quality control and quality assurance materials, for example, copies of internal audit reports, copies of certificate of analyses for the reference materials used, copies of temperature logs and receiving records for the evidence in this case.

Q. Did you physically inspect the evidence in this case?

A. No.

Q. Did you visit the laboratory at which this analysis was performed?

A. No.

Q. Did you discuss your findings with the chemists in this case?

A. With the chemists in the SWIFS laboratory, no.

Q. Did you discuss your findings with any other chemists?

A. No, not with chemists; with lay people, the attorneys.

Q. Now, what is your specific degree?

A. I have a bachelor of science degree in biochemistry from Cal Poly in San Luis Obispo, California, and ABD in Chemistry from the University of New Mexico that's not a degree. That's all but dissertation. It's an indication that I completed all the coursework, examinations, preparation of a proposal

and defense of a proposal, all the things necessary to be advanced to candidacy for a Ph.D. degree, but did not defend my dissertation.

Q. It also stands for "Awaiting Board Defense"; does it not?

A. It stands for what?

Q. Awaiting Board Defense?

A. I've heard that used as well.

Q. Okay. Did you finish your dissertation?

A. I did not. I wrote one chapter of it only.

Q. What was the subject matter of your research?

A. It was amino phosphazine chemistry.

Q. Now, you've titled yourself as an expert in quality assurance and a chemist, correct?

A. That's correct. My area of expertise, although I am a chemist and my particular application of quality assurance has been in a testing environment.

Q. Other than the documents provided to you in this case by the Southwestern Institute of Forensic Science, are there any publications or reference materials you relied on to form your opinion?

A. As a matter of practice, I always rely on the relevant national and international quality standards that are applicable in any given situation for testing. In this case the laboratory at the time of the testing

was accredited to a standard I'll refer to ASCLD/LAB, that's A-S-C-L-D, slash, L-A-B, the 2005 version of their manual. They also made reference to the fact that they conducted an internal audit against the ASCLD/LAB 2008 version of the standard, and that they are presently in the process of developing the quality assistance necessary to comply with ISO 17025, which is an international standard applicable to testing laboratories. So those are examples of the kinds of standards that I use.

In addition, there are the standards that are written very specifically to the field of forensic toxicology. The previous standards that I described are all generally applicable to testing laboratories.

THE COURT: I'm sorry. If I can interrupt for a second. Let's kind of limit this voir dire to the facts or data. I'm not really interested in her opinion about whether she thinks SWIFS is qualified or not at this point. SWIFS is accredited. Facts or data, and let's limit it to that, please. Go ahead.

MR. MCDONALD: Your Honor, regarding quality assurance, the State has no objection to this testimony. Regarding the chemistry and the fundamentals of chemistry, I don't believe it's been established that she

has sufficient knowledge or background in order to support, attack, or refute the validity of the test result in this case.

THE COURT: Well, you haven't asked any questions about it. I mean, the Rule lets you -- I haven't heard any evidence. You're just making a statement.

MR. MCDONALD: That's because the Court limited my examination of the basis of her opinion.

THE COURT: She's talking about whether the labs meet an ISO/2007 or whatever, and I want to know what -- I want you to follow the Rule. You haven't asked her any questions about facts or data underneath her opinion and what her -- I don't even know what her opinion is yet, and you haven't asked her what facts or data she's relying upon for that opinion.

Q. (BY MR. MCDONALD) Are you going to have any sort of opinion concerning the laboratory standards in this case?

A. I have an opinion about the efficacy of the laboratory system for ensuring the reliability of this particular result, and the fact that the laboratory system was deficient in a number of areas necessary to ensure the reliability of the result.

Q. Such as?

A. There are three general areas that I look at. One is sample integrity, and that is whether or not all the necessary controls were put in place to ensure the integrity of the sample from the point of collection through the point of reporting the results.

The second is method validity, whether or not the laboratory used a testing method that had been scientifically validated and found to be appropriate for its intended use, and the third is whether that method was reliably performed, and that is where 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.

Q. So am I correct that you are not disputing the underlying validity of gas chromatography, specifically headspace gas chromatography?

A. That is absolutely correct.

Q. Or the process in this case, just that the process was misapplied?

A. I'm not sure I know what you mean by the process in this case.

Q. What do you mean by the process in the case?

A. The measurement process?

Q. Uh-huh.

A. That is the entire measurement system adopted by the laboratory to ensure the reliability of results. The things that are included are the things that are delineated in the standards that I described earlier, and that is you don't simply rely on assuming that things are in control and operating within specifications and within criteria; you actually monitor them and test them and evaluate them and document them so that there's a written record demonstrating the acceptability of the measurement system at the time a measurement is made.

Q. And with regard to your review of the test in this case and standards associated with it, documents associated with it, what particular issues did you take with the process?

A. That in a number of areas there were deficiencies in the practices that rendered the results unreliable, specifically with respect to sample integrity, there were issues, with respect to method validity there were issues, and with respect to the reliable performance of the method, so in all three areas there were deficiencies in this lab at this time in 2012.

Q. You're not answering my question, ma'am. Specifically what was wrong with the process?

A. Oh, you want to go through all of my findings or my conclusions?

Q. Yes.

A. Okay. Well, first, with regard to sample integrity, the sample in this case was collected in a blood tube that was not designed for use in blood alcohol testing. The blood alcohol tubes that Becton Dickinson manufacture specifically for the purpose of blood alcohol testing are 10-milliliter tubes that have one percent sodium fluoride, and in addition to that preservative, they also have an anticoagulant present, but one percent sodium fluoride.

Those tubes in a certificate of compliance issued by Becton Dickinson actually demonstrates that they are manufactured specifically for blood alcohol determination, have been tested and found appropriate for that particular use.

That one percent sodium fluoride concentration is also specified in the National Clinical and Laboratory Standards Institute document which is sort of the nationwide standard for blood collection practices.

In this case they didn't use a 10-milliliter tube, they used a 4-milliliter tube that has only a fraction of the amount of sodium fluoride present in it. It does not have sufficient sodium fluoride in it to protect the integrity of that sample for purposes of

blood alcohol testing. It only has a quarter of a percent of sodium fluoride present.

Q. By volume?

A. Excuse me?

Q. You use the percentage by volume?

A. Yeah. That's in relation to the volume of the blood sample, assuming that it's a completely full tube.

Q. What else?

A. In addition, well, there is -- the other major issue is that the blood sample was not sealed. The actual tube was not sealed to demonstrate that its integrity had been protected between collection and testing, and the evidence bag or the biohazard bag that the blood tubes were placed in was also not sealed.

There's no evidence, written evidence to demonstrate that when the sample was collected, the color of the additives was checked before the sample was actually introduced to the tube per the manufacturer's recommendations in their -- in the documents that they provide with their materials, it tells you the color that the additive should be and it warns the user that they should not use that tube if the additives have been discolored, and there's no evidence in this case that it was part of the practice or procedure to check the color and make sure that it was the adequate prior to use. So

we don't know that it was appropriately colored, yet we know that it was only present at a fraction of the concentration necessary at time the tube was collected.

Then the sample, according to the records, was placed in a lock box and delivered to the laboratory. There's no records documenting the actual temperature of that sample during the time it was stored.

And temperature and preservation are two of the major factors that the literature has demonstrated are necessary to protect the integrity of blood alcohol samples.

That's the issues related to sample integrity.

Q. Testing?

A. The method validity is the second issue, and that is whether or not a testing laboratory used the method that had been scientifically validated and found to be appropriate for its intended use. It's required by standards. It's not optional.

The laboratory provided a copy of a 2006, I believe, validation study that they conducted, or validation study report for studies that were conducted when they put the new instruments in place, the new Shimadzu instruments in place. I didn't get the raw data, I only got the summary report that provided their

conclusions, but nevertheless, that summary report identified a number of problems with the testing method used by this laboratory, in particular, the fact that the selectivity of the instrumental method that they are using, that is, the ability to conclusively distinguish ethanol from other potentially interfering compounds was not demonstrated. In particular, the instrument that was used to test the sample in this particular case, their validation study demonstrated that there was what's called co-elution or an overlap of ethanol peak and the internal standard peak when acetone was present in the sample.

That's a very serious problem because if acetone was present, there would have been -- if that co-elution existed, there would have been no way for the analyst reviewing the data to recognize that fact. Either ethanol or the internal standard peak would have been elevated by the amount present and would have been misinterpreted as that compound.

So that's a fundamental deficiency of the method, an inability of the method to have the selectivity necessary to be able to conclusively identify ethanol, which is in fact the reason we use gas chromatography for this technique, because it does have the ability to make that necessary separation, but it

requires that you do method development and adjust your instrument operating conditions to accomplish that separation.

Q. And in application of the method?

A. The final area is application of the method, the reliable performance of the method, and there were quite a number of deficiencies in that regard, the first of which was that the laboratory in this particular case in 2012 was not calibrating their instrument on the day that they tested the samples. Their practice was to calibrate it once a month and use that same calibration curve for purposes of determining the amount of ethanol present in all batches for all samples conducted during testing over the following month. That certainly doesn't represent best practice. And under the standards, and when I say the standards, I'm referring to the Society of Forensic Toxicology guidelines in this case, calibrators must be run with every batch of samples. They did not do that in this case.

That's a significant problem because the performance of the instrument changes from day to day. The technique is such that if it's important, if the quantitative result is important, that is how much of something is present as opposed to just identifying what's present, then it's imperative that the instrument

actually be calibrated on the day of testing.

Calibration in this case was even further and even more seriously degraded by the fact that the lab prepared their only calibration standards. They did not purchase them from an external provider of reference materials. They prepared their own standards in house. And their practices at the time were seriously deficient for the preparation of reference materials. Specifically, they used an ethanol stock solution or an ethanol reference material.

THE COURT: Ma'am, let me stop you for just a second just so I understand. So a minute ago you said they only calibrate once per month, and now you're saying they did calibrate using their own samples every day?

THE WITNESS: Yes, sir. Let me clarify. They don't calibrate every day. They calibrated in November for the testing performed in December, and when they calibrated the instrument in November, they used a solution that they had prepared themselves.

THE COURT: Is that actually correct? Because my understanding from the testimony was they purchased it from, I forget the name of the manufacturer, but it was a purchase from a supplier. Is that not true?

MS. GRANT: What they make it from is purchased.

MR. MCDONALD: The stock solution is purchased, and it's not atypical for that stock solution to then be diluted in house to an appropriate level.

THE COURT: So your complaint is that they shouldn't have mixed their own testing solution; is that what you're saying?

THE WITNESS: That is a problem if you don't have the controls necessary to produce reference materials, the materials that you're using to calibrate an instrument. Their problem was that the absolute ethanol, which is in common vernacular, it's 200 proof, but absolute ethanol that they used to prepare their calibrators was expired at the time that they used it. Everything in the laboratory, all of the consumables and reagents and materials that you use in laboratories include a shelf life, and it was nine months expired at the time that they prepared their solution.

Q. (BY MR. MCDONALD) That was a one-molar solution of ethanol?

A. No.

Q. What was the concentration of it?

A. They don't report it in molarally. My recollection is that they prepare -- they start with the neat material, they prepare a high concentration stock and prepare subsequent dilutions from that.

Q. Which is typical of any chemistry laboratory, to start with a stock solution, then dilute it to appropriate levels?

A. That is an appropriate and necessary practice. The problem was starting off with a solution that was expired. It's like starting off with spoiled milk. It's not going to get better when you dilute it.

Q. And the absence of some type of reagents to change the ethanol into another compound, in a sealed environment, especially refrigerated at appropriate temperatures, how is it possible that the solution degraded?

A. It's not only possible, it's likely. That's why laboratories put shelf lives on materials.

Q. So you are saying it reacted with water?

A. No, I'm not saying that it reacted with water. What I'm saying is that the level of control necessary in an analytical chemistry environment may be accustomed to thinking about on a benchtop for a bottle in your kitchen. The level of control necessary is dramatically different in a laboratory environment. Every time you open a bottle, you introduce the potential for airborne contamination of that container. Every time you open a bottle, you introduce the potential for evaporation of material from that container. Materials -- there are any

number of opportunities for compromising or changing the characteristics. That's why a shelf life is assigned.

And as a scientist, you don't get the option of just ignoring those shelf lives. It's necessary if you choose to use a material past its shelf life, the process you must go through is to empirically test that material and demonstrate and have documentation to prove that it's still acceptable after its shelf life. Otherwise, you simply cannot use it.

Q. And empirically, you mean things that you do see by testing?

A. Yes, exactly.

Q. Such as controlled test by a gas chromatograph established that it is a certain concentration after it's diluted?

A. Specifically for that purpose, correct.

Q. Okay. Now, you've talked a lot about the issues that you have with the testing, but you haven't given the Court any published data or materials to suggest that there is a valid scientific basis for your opinion on any of this. You've referenced some standards, but you have previously established you're a chemist, to testify as a chemist here. What published materials did you reference to come to these conclusions?

A. I'm sorry. I'm having a really hard time

understanding your question. Are you suggesting that the standards are not scientifically reliable documents?

Q. There's a difference between the standards and chemistry; you would agree with me on that?

A. These are standards for the practice, the actual functional practice of chemistry, and the application of chemistry in the laboratory.

Q. And you would agree with me that the appropriate application of scientific principles in chemistry is based on science?

A. Certainly.

Q. Especially published science?

A. Certainly.

Q. And having not finished your dissertation in chemistry, you would agree with me that your expertise is not as great as someone who has, say, a Ph.D. in toxicology?

A. I am not a toxicologist. I never claimed to be a toxicologist.

Q. Well, then, other than the standards which have previously been discussed in this case, is there any scientific basis that you can direct the attention of this Court to support the speculative opinions that you have given?

A. Um --

Q. Do you have any peer-reviewed articles?

A. There are a number of peer-reviewed articles that relate to discreet individual issues that are --

THE COURT: Well, let me cut to the chase. I mean, his question that he was just asking you, let's apply it specifically to what you want to testify about. The first thing you mentioned was that you have an issue with the sample integrity because you're saying that it -- that the blood should have been drawn into a 4-milliliter tube instead of a 10-milliliter tube?

THE WITNESS: Yes.

THE COURT: What's the scientific basis for making a distinction upon the size of the tube that the blood was drawn into?

THE WITNESS: The key principle is not the size of the tube, how much blood volume it's collected, but the concentration of the preservative in those tubes.

THE COURT: All right. So, you know, I'm not so good at math, but if a 10-milliliter tube has a one-percent solution and a 4-milliliter tube has a quarter percent of it in there, then you're really talking about a less difference than what it might appear initially, if it's a one-percent sodium fluoride and it's a quarter-percent sodium fluoride, and it's a smaller container?

THE WITNESS: Concentration is corrected for the volume, yeah.

THE COURT: All right. Is there any peer-reviewed articles that say that you can't consider a blood test to be reliable if the blood tube is only drawn into a tube -- if the blood is only drawn into a tube that has one percent versus a quarter percent versus no -- no sodium fluoride at all? What data or what peer-reviewed articles are there that support what you want to say?

THE WITNESS: There's a large volume of literature on the subject of --

THE COURT: Well, name one. Name one.

THE WITNESS: One is a report by Chang. It is explicitly referenced in the NCCLS standards which are the national standards used clinically for laboratories nationwide, and it specifically references that as an example when it is addressing the need for one-percent sodium fluoride when the purpose of the testing is for blood alcohol testing.

MR. MCDONALD: And, Your Honor, may I approach the witness?

THE COURT: Yes.

Q. (BY MR. MCDONALD) You're referring to the article by Chang labeled The Effective Temperature on the

Formation of Ethanol by Candida Albicans in the Blood?

A. I'm not sure that that's the one, but I will take a look. There are so many, I wouldn't try to remember the title.

MR. MCDONALD: Marked as State's 300.

THE WITNESS: I'm not sure that this is the one because this is specifically evaluating temperature rather than preservative concentration.

Q. (BY MR. MCDONALD) So what you're telling the Judge is this doesn't ring a bell, but you can't point this Court to the specific source that you're thinking about to support your opinions?

A. I certainly could if I could look up in my notebook, but --

THE COURT: All right. Hand the lady her notebook.

Q. (BY MR. MCDONALD) Do you have your notebook?

A. I do. It's in my backpack there. The big thick white. I think I have it in there.

MS. GRANT: And, Judge, I'll point out that the State hasn't asked Ms. Arvizu anything other than her schooling, hasn't asked her anything about her employment history, her qualifications, her certifications or any of those sorts of things, which I think would be relevant in this hearing.

THE COURT: Okay. Well, right now I just want to stay on top of this issue about the amount of sodium fluoride and the quantity resulting from this test.

THE WITNESS: I'm booting up to actually get the clinical standards that include the reference.

MS. GRANT: Your Honor, I actually have it pulled up on my computer. May I show it to her?

THE COURT: Sure.

THE WITNESS: Okay. This is a copy of the NCCLS standard that has been around for a number of years. It's sort of the national guideline for sample collection, collection of blood samples from humans, and it specifically describes, "However, it has been documented that changes produced by contaminating microorganisms can affect alcohol concentrations in blood specimens even in the presence of preservatives. Blume and Lakatua reported that various organisms isolated from contaminated blood specimens were capable of producing ethanol when inoculated into bank blood. Candida albicans was particularly active in this regard, producing significant quantities of alcohol even in the presence of sodium fluoride. These investigators recommended that fluoride," parenthetically, "10 milligrams per milliliter or .24 millimoles per

milliliter," and that corresponds to a concentration that is usually expressed as one percent, "be used as a preservative and that care should be taken to assure that microbial organisms are not introduced into the specimens."

Q. (BY MR. MCDONALD) That study dealt with blood drawn from dead individuals, did it not?

A. There have been a large number of studies dealing with people --

Q. That was not my question.

A. The Blume study?

Q. Yes.

A. I don't know if that's the case, but if I could continue. There's one more, Winek and Paul.

THE COURT: Ma'am, I'm sorry. I need to make a decision here about -- and I'm curious. This paper that you're referring to, this NCCLS paper, what is the date of that and where was it published?

THE WITNESS: NCCLS Number 17, Volume 14. I'm not sure. I'll have to scroll back to the very beginning to see when this actually, this version was published, but it's been a long time.

THE COURT: Okay. And I thought I heard you say that that was a study where they introduced contaminants into the blood. Is that right?

THE WITNESS: Yes. When these are studied empirically in the laboratory, they introduce contaminants.

THE COURT: So the study that you're relying upon is a study where potentially contaminants were introduced? I presume the sample was not -- is that right?

THE WITNESS: That's correct. We have to use knowns.

THE COURT: And I presume that the sample in that study also was not refrigerated?

THE WITNESS: There have been both.

THE COURT: Is that correct?

THE WITNESS: There have been studies with refrigerated, studies with it unrefrigerated.

THE COURT: I'm talking about the one that you're referring to.

THE WITNESS: Yes.

THE COURT: Is that right, it wasn't refrigerated?

THE WITNESS: Both studies have been, both types of studies have been --

THE COURT: What is that one, the one you're talking about, do you know?

THE WITNESS: I don't know this particular

one.

THE COURT: Okay.

THE WITNESS: Let's see.

MS. GRANT: Judge, just for the record, I'm not planning to ask her any questions about, that Mr. Schwane testified about microorganisms possibly causing ethanol to perform.

THE COURT: Okay. So this whole thing about the sample integrity you don't plan on --

MS. GRANT: No. The sample integrity as far as not following what the national standards are in using a tube that does not have one percent, but he's already gone into the reasons that that can be -- or that ethanol can form in the tube. He already testified to that. I'm not going to ask her to give an expert opinion on candida albicans causing fermentation or any of those things, just what is the best practice versus what was done in this case. That's what -- that's what we're doing.

THE COURT: Okay. All right. Thank you.

Go ahead, Mr. McDonald.

MR. MCDONALD: I was just simply going to state, Your Honor, under Rule 702, this lady's opinion has to be distinguished from that of a layperson to an expert. And if she has no knowledge base on which to base that opinion, only reference to studies that she is

not familiar with, how can it be demonstrated that there is a valid scientific basis for that opinion? And if there is no valid scientific basis for that opinion under Rule 702, then by definition under Rule 702, her opinion is not helpful to this jury.

Taking counsel's argument that she has already cross-examined a chemist on this subject, they are equally well suited as her to make a determination as to the weight to be given to that evidence. Her testimony on the subject is irrelevant.

THE COURT: All right. Well, I'm trying to take this issue by issue, but --

MS. GRANT: But, Judge, like I said, you haven't even heard what Ms. Arvizu does for a living, so I don't know how you can even make decisions.

THE COURT: Okay. We'll go on. Did you have any other questions for the witness?

Q. (BY MR. MCDONALD) Well, moving along to the sealed bag/not-sealed bag, what scientific published peer-reviewed literature tells you that it must be sealed in such a way that it was not, other than the standard that you just referenced?

A. It is the standards that specifically require provisions to ensure sample integrity.

Q. Such as an ASCLD/LAB sealing evidence delivered

into a secured location when the lab receives it?

A. Yes, exactly.

Q. Okay. Are you familiar with published peer-reviewed articles that say that following that process is not only appropriate but what happens in laboratories that are ASCLD certified across this nation? Is there something that says otherwise?

A. I'm sorry. I really don't understand your question. Is --

Q. All right. Moving on to no written evidence of color of reagents contained within the blood tubes, you would agree that both potassium fluoride and sodium oxalate are solid in the forms contained in these tubes?

A. They are.

Q. And they are unreactive? In the vacuum such as inside of a gray-top tube?

A. In theory, they should be unreactive in those conditions.

Q. Okay. Do you have any evidence to suggest that the vacuum, integrity of that vacuum was not in place in this case?

A. No. That's why --

Q. Okay. And that being the case, is there some published peer-reviewed literature that would tell you that visual inspection is required in the absence of any

suspicion that the tube's integrity has been violated? Do you have any public peer-reviewed literature on the subject?

A. As a quality auditor I evaluate whether or not a laboratory complies with requirements for critical, what are called critical reagents.

Q. Okay. That was not my question, ma'am. Is there some scientific basis for your opinion that the sample may have been miscolored when there's no evidence that it was? It's a yes or no question.

A. I have no evidence as to what --

Q. Okay. Moving on to the temperature of the sample and sample preservation. Is there some published study that says when blood is tested within 48 hours of the time it's drawn and that it's not kept at room temperature, that the result is invalid? Do you have a published peer-reviewed article that can assist this Court on that subject?

A. In the case of unknown samples, we never know if the results are correct or not or if the sample can be considered representative at the time it was collected unless all the things that can go wrong have been appropriately controlled. Temperature is one of those things.

Q. Okay. So you're speculating that there could be

a problem on the basis of no empirical evidence?

A. As a scientist in the field of quality assurance, there are errors that are silent. There are problems that occur with respect to sample integrity, for example, or other things in the laboratory that are silent and that an analyst won't necessarily be aware of. That's why you put those controls in place.

Q. So I take it that --

THE COURT: Let's not talk over each other, please.

MR. MCDONALD: I apologize, Your Honor. I object to the witness being nonresponsive. It was a yes or no question.

THE COURT: All right. Next question.

Q. (BY MR. MCDONALD) Moving on to method validity. We've already established that you do not disagree that Henry's law, been around since 1803, is a valid law of science, and that gas chromatography applying it to the testing for the presence of ethanol is a valid method. Other than by speculation, how is it that you believe that the validation studied in 2006 is not also valid in 2013? Do you have a published peer-reviewed article that says the methods have changed since 2006?

A. Such an article will never be publishable.

MR. MCDONALD: Objection, it's

nonresponsive.

THE WITNESS: I don't know how to answer your question when it's not plausible.

Q. (BY MR. MCDONALD) Okay. Moving on to serious degraded prepared in-house reference solutions. Do you have -- assuming for the sake of argument that valid principles for diluting solutions, you know, we talked about molarity, and there's a lot of chemistry we're not going to cover in court today, but assuming that you take a known standard, and based upon 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 that methodology is improper?

You already said it's a fundamental of chemistry.

A. No. No.

Q. Okay. Then in this case you agree that you were not present when they were prepared?

A. No.

Q. That you have not been to the lab?

A. No.

Q. You have not inspected the samples?

A. No.

Q. You have not inspected the standard?

A. No.

Q. You have not inspected the instruments?

A. No.

Q. And so you have no empirical evidence on which to base your opinion in this matter?

A. I base my opinion in this matter on the contemporaneous records provided by the laboratory documenting their practices at that point and time.

MR. MCDONALD: May I approach the evidence, Your Honor, to show to the witness?

THE COURT: Yes.

Q. (BY MR. MCDONALD) Now, we've established that you don't proclaim to be an expert in chemistry or instrumental analysis, correct?

A. I am a chemist, and I have spent 30 years reviewing the results of instrumental analysis.

Q. You previously told this Court that you don't proclaim yourself to be a chemist?

A. My primary area of expertise is in quality assurance as applied to chemical measurements.

Q. Do you recall your testimony in United States V. Gomez in the United States District Court for the District of Colorado as noted in a decision filed on September 16th of 2011, and I quote: Consistent with her expertise in auditing, not chemistry,

Ms. Arvizu's testimony is best understood as indicating that she lacks sufficient information to be able to vouch for the reliability of Ms. Ervay's (phonetic) results, not as contending she performed the test incorrectly or misread the results.

A. That --

Q. So now are you telling this Court --

A. That was not my testimony.

Q. Okay. Now, let me show you some exhibits that have been previously placed into evidence. Defendant's 19, chromatograms in the case.

A. Yes.

Q. Okay. Defendant's 20, more data from this batch run.

A. Yes.

Q. Okay. Defendant's 17.

A. Yes.

Q. Defendant's 13.

A. Yes.

Q. Defendant's 16.

A. Yes.

Q. Defendant's 18.

A. Yes.

Q. Defendant's 11.

A. Yes.

Q. You would agree with me that the jury is capable of reading these documents and, based on testimony provided at this trial, forming their own opinions?

A. If the jury happens --

Q. Since you're not an expert?

THE COURT: Please don't talk over the witness.

THE WITNESS: If the jury happens to include people who have at least been through an undergraduate chemistry curriculum in terms of understanding the basic principles of gas chromatography, if they all have an understanding of gas chromatography at an undergraduate level, then that would be a true statement.

MR. MCDONALD: Your Honor, at this time the State would object under Rule 702. This witness has no sufficient basis to offer an expert opinion helpful to this jury as it pertains to the testing of this case.

THE COURT: I'm going to let Ms. Grant ask her some questions.

MS. GRANT: Thank you, Your Honor.

CROSS-EXAMINATION

BY MS. GRANT:

Q. Ms. Arvizu, what is your professional certification?

A. I'm certified as a quality auditor by the

American Society for Quality.

Q. And what is your employment background?

A. After graduate school I started working for one of the operating contractors at a Department of Energy laboratory at one of the national laboratories where I established and managed a full-service analytical testing laboratory. I was there for about 10 years. That was a laboratory that had a full suite of analytical instrumentation including several GCs.

My work there was everything from initially procuring and starting up and validating the instruments to ultimately hiring the people and conducting data quality assessments, reviews of the data reported by that laboratory.

I then started my own quality assurance consulting firm and worked primarily for federal agencies, served as program manager for the US Navy's nationwide quality assurance program, evaluating and approving the testing laboratories that did analytical work for the navy, both government and commercial laboratories, everything from I wrote the standard that served as the basis for approving the laboratories, led audit teams, conducting on-site audits of the laboratories, and then once a laboratory was approved on an ongoing basis throughout their service to the navy,

conducted data quality assessments of the results reported by those laboratories. And in the event that the data was of insufficient quality for the government to make a decision, I brought that to the attention of the navy so they could avoid paying for all that invalid data and have the work redone.

Q. So did you take data from a laboratory, analyze it, and render an opinion?

A. Routinely that's been my function for decades.

Q. Now, you -- did you author the quality standards that are used by all navy laboratories?

A. Yes. I authored the quality standards that were used to evaluate and approve the government labs and the commercial labs that did testing work for the navy.

Q. Have you provided any training in this particular field?

A. Extensive training in a lot of venues, everything from field technicians doing sampling, to bench chemists, to the engineers who use laboratory results and needed to understand how reliable they were, to lay audiences, lawyers, judges. I taught a session on judging science to a group of appellate judges at Duke.

Q. Have you provided testimony as a quality or laboratory quality assurance expert in court before?

A. Yes. At least 100 times in state, local,

federal, administrative, international courts.

Q. You've traveled out of the country to testify?

A. I have.

Q. And what fields of endeavor have you been accepted as an expert?

A. When those kind of terms are used, I'm usually introduced as an expert in the field of testing laboratory quality assurance.

Q. And does that go from sampling, lab operations, analytical procedures?

A. Yes. The scope of my testimony has addressed everything from the collection of the sample in the field, measurements made in the field, through the entire testing process in the laboratory.

Q. Now, in this particular case you received data from the lab -- well, from me, but from the laboratory, and then eventually did you provide a list of additional items that you wanted to look a little further into some certain areas?

A. Yes.

Q. And then subsequent to that, did the lab turn over additional data to you to make your final conclusions about this case?

A. Yes.

Q. And based on the audit trail or the paperwork

from the lab to back up their opinion of what the blood alcohol concentration was in this case, did you then render your opinion?

A. Yes. In theory there should exist an audit trail for work reported by a laboratory; that is, 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 foundational 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 a determination. That's what I attempted to do in this case from the records that were provided by the laboratory.

Q. Now, the exhibits that you were shown by the State's attorney a few moments ago, are many of the things that you reference in your decision-making process in regards to the expired alcohol, 200-proof alcohol certificate, the -- I think something that hasn't been addressed is an issue with one of the pipettes, correct?

A. Correct.

Q. And there's a certificate regarding that, right?

A. Correct.

Q. And then there was another issue with regards to an ampoule of alcohol that's used by labs, that there's a certificate regarding that, correct?

A. That's correct.

Q. And then there are the chromatograms or the calibration records for this instrument for November which you have some opinions on, correct?

A. That's correct.

Q. And then there are the chromatograms from this case, correct?

A. Yes.

Q. And then there are the batch run chromatograms which show the .20 and the .08 chromatograms, and there are some issues with those that you have an issue with, correct?

A. That's correct.

Q. In fact, looking at the sum total of the whole batch run, you formed an opinion with regards to something that was going on in that particular sequence, correct?

A. Yes. Yes. I've been reviewing gas chromatography data since the 1980s.

THE COURT: Well, what's the opinion?

THE WITNESS: Excuse me?

THE COURT: What's your opinion?

THE WITNESS: There are a number of significant quality control failures that render these results quantitatively unreliable.

THE COURT: Why?

THE WITNESS: The use of an expired standard material to prepare their calibration standards, the presence of contaminants in the control samples that they used. They should in fact have been pristine. They should not have had anything unexpected or unknown present in them if they had been appropriately handled and managed in the laboratory.

THE COURT: What contaminants are you talking about?

THE WITNESS: I'd have to show on the chromatogram.

MS. GRANT: May I approach, Your Honor?

THE COURT: Yes.

Q. (BY MS. GRANT) I just want to show you on one of the exhibits. I will put them up. I'll put it up on that.

A. Okay.

Q. I'm showing you Defendant's Exhibit 20 being the .20 control. This would be on page 2, and if I slide it up to show the chromatogram.

THE COURT: Well, that's too close, at least

for me.

MS. GRANT: Can you see that? Is that too close for you, Judge?

THE COURT: Yeah, I can't -- I mean, I can see --

MS. GRANT: Is that better?

THE COURT: That's better, I guess.

Q. (BY MS. GRANT) All right. Ms. Arvizu, what does that chromatogram demonstrate to you when you're looking at what's up on the screen right now?

A. This laboratory used quality control samples, two different quality control samples during the course of their batch when they tested the unknown samples. They didn't calibrate, but they used a couple of different control samples. This is one of them. This particular one is labeled as .20 control.

They provided a certificate of analysis from Cerulean for a .20 sample, so I have to assume that that's the one they use.

Notice that I have to assume. They don't have an audit trail. They don't document that that lot number of control was the one that they ran that day. That's necessary. But even if I assume that that was the case, you can see that there are these small peaks present in this sample that are detectable on the

baseline. You can see them.

Q. If you touch the screen, you can actually highlight them.

No, no, the screen in front of you.

A. Oh, okay.

THE COURT: Can you back it out a little bit more, please.

MS. GRANT: Is that better, Judge?

THE COURT: Yeah.

Q. (BY MS. GRANT) You're talking about the various little bumps?

A. All of these little bumps on the baseline. The material when it's purchased from Cerulean, Cerulean is accredited to ISO Guide 34. They are an established reference material provider. They know how to do this work properly. And they do analysis when they prepare a batch and demonstrate that their materials are actually acceptable, they are prepared in a traceable manner, everything is documented and everything is in control at the time that they prepare it.

When they provide as they do on their certificate, a gas chromatogram, one on this standard, there is nothing visible. These little peaks are not there. They were not introduced at the point when Cerulean made it. They appeared after the material was

used in this laboratory. That's an indication that there is an external source of contamination somewhere in this laboratory that introduced these materials to the control sample.

Now, if the laboratory was handling and using that material properly and if they had a well-controlled instrument, that should not have happened. That's evidence that their system is contaminated.

Q. Now, going on to the next one, and it was right after it in the batch run, this would have been -- excuse me. This was at the same time because there was on Channel number 2, this was their .20 control, very same control that we were just talking about. It was running on the second column. It also has various unexplained peaks, correct?

A. Correct.

Q. And that would be another indication of contamination?

A. Yes.

Q. And our .08 control, also same batch run, a bunch of peaks?

A. Yes.

Q. And if we went page by page on these, these in the area that Josh Brent's blood was tested in and everyone that should be esteemed references, there's

contaminations?

A. Yeah. I think it was run three times during the course of the batch, and it always showed evidence of the contamination.

Q. And even farther than that, at the end they put in a negative control which should have just been water and not n-Propanol, correct?

A. Yes. Negative control sample as prepared here should have only had water and internal standard n-Proponal.

Q. And here there's various peaks which would be contamination, there's volatiles?

A. Yes. There's volatiles that went through the column and were detected.

Q. On the other detector all of a sudden ethanol pops up?

A. Yes. There's one of those peaks that was showing up at the time that the lab was determined an ethanol peak shows up.

Q. But it should have been gone into this instrument as just water and n-Propanol?

A. That's correct.

THE COURT: What you just showed is what page of what exhibit?

MS. GRANT: I'm sorry. That would be the

same exhibit we've been talking about is 20 and page 7. Defendant's Exhibit No. 20, page 7.

Q. (BY MS. GRANT) So if we continued on each page throughout the entire run of reference samples that were in Josh Brent's run, the contamination shows up every single time?

A. Yes.

Q. Now, would you attribute that to doing something wrong or something going wrong in preparation of the samples?

A. You know, that's the kind of thing that needs a very intense investigative effort to determine, but it is unlikely that it is being introduced in the instrument. It's probably more likely that it's being introduced during the presentive stage. That's just a guess, and you would need to do testing to evaluate that. It's not what is commonly referred to as carryover.

Q. Because it's consistent throughout the entire run?

A. That's correct.

Q. Carryover is usually just between one vial and the next?

A. That's correct. This is contrasted with carryover. This is contamination.

THE COURT: Could I see Defendant's Exhibit

20, page 7.

Okay. Ma'am, just so I'm clear, do you recall what we're talking about?

THE WITNESS: Yes. It's not up there, but a chromatogram, if I'm reading this right, it shows .005 concentration. I'm reading it wrong, but it's a measurable amount.

Yes.

THE COURT: A very minute.

THE WITNESS: Yes. The instrument measures it because it appears at a high enough concentration.

THE COURT: Okay.

THE WITNESS: These other things weren't even measured.

THE COURT: Under the conditions where they set their data standards. All right.

THE WITNESS: You have the ability to set those parameters.

THE COURT: Okay.

MS. GRANT: I have one final question, Judge.

THE COURT: Go ahead.

Q. (BY MS. GRANT) And Ms. Arvizu, when you have these peaks that are unidentified, the instrument is not identifying them, is that because they are outside of

whatever four or five things the instrument has been calibrated to look for?

A. Yes.

THE COURT: You just said it is identifiable, but it's set so low and it's not registered.

THE WITNESS: It's -- it would not be identifiable by this instrument because GCs only identify a peak when you give it instructions, when you calibrate the instrument and tell it that something that comes out at this retention time should be identified as this compound. So in this case, the only reason the machine said it was ethanol is because previously the analyst essentially told the machine that anything that comes out at this retention time should be identified as ethanol.

THE COURT: Okay. Any other opinions you want?

Q. (BY MS. GRANT) I, in case you -- I'm not sure how things came out in this communication. The other pages say nothing because that instrument hasn't been told what comes out at those times?

A. That's correct. The detector on this particular GC is kind of a stupid detector. It's a flame ionization detector. It simply detects the presence of something. It's not capable of identifying what that compound is.

There's no structural information available from this technique. It just burns it up and gives a signal. So its only ability to assign an identity to a peak is if you've run standards and told the instrument anything that comes out of this retention time should be identified as this compound.

THE COURT: All right. Any other questions for this witness?

MS. GRANT: No, Judge.

THE COURT: Anything else from the State?

MR. MCDONALD: Judge, I have just a few that I think will really assist the Court in understanding.

THE COURT: Go ahead.

MR. MCDONALD: May I have the exhibit?

THE COURT: Certainly.

REDIRECT EXAMINATION

BY MR. MCDONALD

Q. You would agree with me that, Ms. Arvizu, that a two-channel gas chromatograph is better than a one-channel gas chromatograph so far as identifying compounds?

A. Sure. In terms of selectivity, single-column GC is considered only a screening technique. Confirmation requires the second column.

Q. And just to assist the Court in understanding,

you know, on this exhibit, we have different compounds such as methanol. That's an alcohol with one carbon atom, right?

A. Correct.

Q. Ethanol has two carbon atoms?

A. Yes.

Q. Propanol has three?

A. Yes.

Q. So their chemical structures are different so they weigh more?

A. That's one of the results.

Q. That's one of the properties. The difference between isopropanol and n-Propanol is isopropanol kind of looks like the carbon is very soft and the n-Propanol has a different shape and space?

A. Yes.

Q. Okay. You would expect that n-Propanol or isopropanol would come off at about the same time because they have basically the same chemical structures, they are just arranged differently?

A. Not necessarily. That's based on an assumption that it's purely a weight-driven phenomenon, and that's only one of many, many factors that influence.

Q. And I'll give you that, since they're the same basic compound, but there's a distinct difference in

between, say, methanol and isopropanol where they come off a column?

A. Off this particular column.

Q. Okay. So we agree that methanol will not appear at the same place as isopropanol on a gas chromatograph such as this one used in this method; they come off in different places, correct?

A. Yeah. I have to clarify that that's really driven by the column that you're using and the operating conditions that you're using. Everybody using the same column doesn't get the same retention time.

Q. Correct. But although you're not getting the same retention times, they are relative to each other because gas chromatography, which we've already agreed has been around for decades and it's reliable, is able to distinguish in between volatile compounds, correct?

A. It is able. It's also capable of not being able to distinguish, having two things come out at the same retention time.

Q. And let's talk about that.

A. Okay.

Q. When we're dealing with a dynamic, we have helium flow, we have a baseline, correct? Because there are other compounds in air that when heated go into the analysis, the stream. And what we're seeing here, these

compounds are clearly outside of this column, since you said every column is different, we know where ethanol is supposed to come off. These compounds are early for ethanol, therefore, they cannot be ethanol?

A. I'm -- methanol cannot be ethanol? Sure.

Q. Those compounds are early for ethanol on this column, meaning that they are not ethanol. These little squiggly lines?

A. Oh. Okay, I understand. All right. That's correct.

Q. Okay. Now, that's on channel 2. You have already agreed with me that channel one, it's good to have another channel, right?

A. It's necessary to have another channel.

Q. Okay. And we have these different compounds, which you've already told the Court are different, they come off of a given column at different times.

A. Yes.

Q. Okay. And so here what we've seen is n-Proponal down here for this column, we know that's where it's supposed to be?

A. Yes.

Q. We see ethanol here, we know that's where it's supposed to be?

A. Yes.

Q. And then we have little blips in our baseline down here that are too early for ethanol or too late for ethanol?

A. Yes.

Q. Okay. So they are not ethanol?

A. They are not.

MR. MCDONALD: Okay. Then, Your Honor, I think it's pretty clear that her opinion that the blips on the baseline in this case, if they are not ethanol, they couldn't have contributed to the ethanol score in this case and therefore her testimony is irrelevant.

THE WITNESS: I'm sorry, but that misrepresents my conclusion.

THE COURT: All right. I think I've got an idea what everybody wants to put in front of the jury or talk about.

Any more argument from the lawyers?

MR. MCDONALD: None from the State, Your Honor.

THE COURT: Ms. Grant?

MS. GRANT: No, Your Honor.

THE COURT: Okay. Well, this testimony about the sample integrity is proper testimony, about the sample integrity, that the blood tube is not appropriate or whatever her opinion was in that regard and the

percentage of sodium fluoride was not appropriate, or the possibility of some kind of candida albicans kind of contamination, the scientific theory that it's based upon, I think what her scientific theory, what she's proffering I think is very tenuous at best. And I think the technique applying it here in this case is not valid, so under the Kelly standard I'm not going to allow any testimony about sample contamination. There's just no basis for that at all.

The -- in the absence of any -- any kind of -- well, I mean, I guess you can -- obviously she can mention that the blood sample wasn't sealed individually on the tube or whatever. We've already got testimony about that. But any testimony that that's not the scientifically valid way of SWIFS conducting their business, there's no scientific basis for her to say that that's not a valid way for them to conduct their business.

I'm not going to allow any testimony about them, about the nurse or whoever being required to -- or speculation that the color additive changed color or whatever when there's absolutely no evidence for that whatsoever. I'm not going to allow any testimony about that.

I'm not going to allow any testimony about

the temperature in the lock box not being appropriate either because the evidence is that it was. It's pure speculation on this witness's part to say otherwise, so I'm not going to allow any testimony about that.

The -- for her, for this witness -- she doesn't have a scientific valid basis, scientifically valid basis either for saying that there's some kind of a contaminant in the testing. But the one area that I will allow is for her to talk about the fact that there is an ethanol peak when the n-Propanol sample is put through. She can talk about that.

MS. GRANT: I'm not under -- Judge, may I respond?

THE COURT: Sure.

MS. GRANT: I'm not understanding what you're saying there's no scientific basis for saying that there is contamination. I don't think that I would ask her to conclude something, but I think I should be able to ask her what the possible reasons are for that or how that can happen through the analysis because that's very relevant in this case.

THE COURT: For her to speculate that that happened here in this case, there's no basis for that at all. I'm not going to allow that. There is no scientific basis for her to suggest to this jury that

that sample was subject to some kind of, candida albicans or some other kind of contaminant that elevated the blood result.

MS. GRANT: That isn't what I was going to ask her, Judge.

THE COURT: Well, what's the point of that testimony?

MS. GRANT: If sample preparation, if the samples are being contaminated during the sample preparation process, which is not even actually in question because you wouldn't have those chromatograms come out the way they were if that was not happening, but it calls into question the scientific validity of the entire test run. And especially if you've got ethanol showing up in a jar of water. So to try to isolate one part of it, it's one testing sequence. It's not individual things. It's one large testing sequence. And all of the things that are going on are going on throughout the testing sequence.

THE COURT: There's no scientific basis to suggest that there was some kind of contamination in this case. It's pure speculation.

MS. GRANT: Well, Judge --

THE COURT: Like I said, the -- what?

MS. GRANT: Well, something happened, and so

could I not ask what are the ways that that could occur in a testing sequence? How is that not relevant, Judge?

THE COURT: Well, like I said, I will allow inquiries about why there's an ethanol peak when, I think when there is not otherwise an explanation for it. But the other stuff I don't think there's a scientific basis for. It doesn't aid the jury at all in understanding the evidence that's been presented.

MS. GRANT: Well, with regards to the standards, the .20, the .08 that we have there in Defendant's Exhibit 20, can I go through each one and say why, are these peaks supposed to be here?

THE COURT: Are you talking about, for example, where it should be a .20 and it's a .196, is that what you're --

MS. GRANT: No. I'm talking about the testing of the chromatogram and the fact that there are things coming out of that chromatogram that were not supposed to be there.

THE COURT: You're talking about the bumps on the baseline?

MS. GRANT: There are peaks that mean volatiles were in that jar when it came through and were detected on the detector. It's not supposed to be there.

THE COURT: I haven't heard this witness

explain how, with any kind of scientific basis, why that would make the other testing not valid. It's not been tied together. It's just pure speculation.

MS. GRANT: You want me to do that now?

THE COURT: Okay.

RECROSS-EXAMINATION

BY MS. GRANT:

Q. Ms. Arvizu, when you are looking at a testing sequence like it's done in this case and you have all these chromatograms to look at, what is the scientific significance of seeing contamination or unexplained peaks throughout the testing sequence?

A. It is profoundly significant because those control samples were the laboratory's sole basis for making a determination that they thought the results were good enough to report. They base everything on the fact that those control results were acceptable. The problem is that the true value of those control results cannot be considered to be known because we know that it was contaminated. We know that the results that they got in their measurement system are not the same as the chromatogram provided by the manufacturer who prepared that control sample. They got a completely flat baseline with nothing else in it.

THE COURT: See, I'm not hearing any

connection here. Is she some GC expert that can say that that somehow invalidates when a control sample is set for a .2 and a test comes out .194? I'm not seeing any connection there and so I'm not going to allow that before the jury.

MS. GRANT: So I guess this is considered our record.

THE COURT: That's, yeah, or you can make more record later if you need to, but based on what I'm hearing, so --

MS. GRANT: But we can talk about contamination of ethanol being in the negative?

THE COURT: About what?

MS. GRANT: Contamination of ethanol being in the negative, the blank?

THE COURT: Yes.

MS. GRANT: Okay.

THE COURT: All right. Okay. Are we ready for the jury, then?

MR. MCDONALD: May we have a bathroom break, since we're --

THE COURT: Yeah, that's fine. We'll come back in ten minutes.

(Recess taken)

THE COURT: I will allow you to mention what

control sample was nine months expired.

MR. MCDONALD: Judge, if I could on that issue, she said she's assuming that was the one that was used but did not know whether or not that was the one used for the sample, so wouldn't that not fall under speculation?

MS. GRANT: No. This is -- that's a different -- that's a standard. This is the calibrator and that is the certificate.

MR. MCDONALD: That's not what her testimony was. It was, and I quote, I don't know that they used a different one, different retention time. She said that she didn't know whether the certificate matched what was used in the run.

MS. GRANT: That's the other certificate for the ampoule. We're talking about the calibration.

THE WITNESS: The certificate for the control sample I can't show was the one that was actually used. I have a press log for the calibration solution that says that they used the expired ethanol.

MR. MCDONALD: Well, and what the Court is going to allow testimony on is the channel 3 control sample, and you don't know that that was the one that was used, it would seem that your testimony about a certificate that may or may not be related to the expired

run, expired sample would be irrelevant.

MS. GRANT: There were two different things.

THE COURT: She said that that was the one used.

Isn't that what you said?

THE WITNESS: Yes. That was the one they used to calibrate the instrument.

THE COURT: Well, you can clear it up on redirect, or whatever you want to do on redirect, but I'm going to let her mention it.

MR. MCDONALD: Your Honor, I need to request a motion in limine regarding the subject matter that you ruled inadmissible but they just approached to the extent that they think the door has been open to it.

MS. GRANT: I don't think we're going to open up the door on what I just said.

THE COURT: Let's get the jury.

THE BAILIFF: All rise.

(Jury ushered in)

THE COURT: All right. Be seated, please.

Ms. Grant, you can go ahead.

MS. GRANT: Thank you, Your Honor.

JANINE ARVIZU,

having been previously sworn, testified as follows:

DIRECT EXAMINATION

BY MS. GRANT:

Q. Hi. Ms. Arvizu, can you introduce yourself to the jury.

A. My name is Janine Arvizu, and I'm a laboratory quality auditor.

Q. And what does a laboratory quality auditor do?

A. I work for clients who are using lab results to make really important decisions, and then I help them understand how reliable those decisions are based on whether or not that laboratory complied with standards that are designed to ensure good quality results out of laboratories.

Q. How do you determine the reliability of a result?

A. Basically I conduct the data on it. I go in and look at the records that the laboratory generated when they were doing their testing, and I make sure that everything was working properly and that they followed their own procedures, and that their procedures complied with standards to make sure whether or not the results are reliable. It's very similar to an IRS audit. You can't just tell the IRS auditor I remember making that charitable donation; you have to actually be able to produce the records to prove how much money was the donation for and who did you make it to and what date was

it made, all those kinds of details. The same thing happens in a laboratory. If you didn't write it down, you didn't do it. If you produce an audit trail, then another scientist can come in after the fact and look at your work and determine whether or not everything was done properly and you can rely on the results.

Q. And what is your educational background?

A. I have a bachelor of science degree in biochemistry from Cal Poly in San Luis Obispo, California, and ABD in chemistry from the University of New Mexico, which is not actually a degree. It means I was in the Ph.D. program and I completed all of the coursework and I completed all the exams, and preparation of proposal in a defense, but I did not defend my dissertation. I went to work.

Q. Now, do you have any professional certifications?

A. Yes. The American Society for Quality is sort of the professional trade organization for people who work in the field of quality assurance, and I hold the certification as a quality auditor from the American Society of Quality. I've also been trained very specifically in the assessment of laboratories to the laboratory standards.

Q. And what is your employment background?

A. I started working for the Department of Energy at one of the national laboratories. I was there for about a decade, and I set up and then managed a full-service analytical testing laboratory that conducted testing on samples from Department of Energy sites. We had a lot of instrumentation in that lab including a number of gas chromatographs, which is the technique employed in this particular case. So I've actually -- I've purchased gas chromatographs, I've used gas chromatographs for testing volatile samples, which is exactly the same techniques as used here, but more importantly, I've spent about three decades reviewing the results of gas chromatography testing and evaluating their quality.

Q. Did you ever manage a laboratory quality consulting firm?

A. Yes. When I left the Department of Energy laboratory I set up a quality assurance consulting firm, and we mostly worked for the federal government reviewing the quality of work performed for government agencies. I served as program manager for the US Navy's quality assurance program and evaluated the labs that do analytical work for the navy. This was the program that they had to go through to be approved to do work for the navy, both government and commercial laboratories.

Once they were approved, after we audited them, then we evaluated the quality of the work that they reported. So we on an ongoing basis evaluated their work and made sure they were still adhering to all of the requirements and producing work of acceptable quality.

Q. Did you author the quality standards that were put into place in all the navy laboratories?

A. Yes. The document that served as the basis that they all had to comply with in order to be approved to do navy work, I wrote that.

Q. Now, have you ever trained anyone in this field?

A. I have over the years done a lot of in-house training, a lot of training in continuing education courses, everything from field technicians doing sampling to bench chemists and bench technicians who do testing in laboratories, to the engineers that actually use lab result and need to understand how reliable they are, and I've trained lawyers who by and large are not technical, don't have science backgrounds for the most part, and Judges, so pretty much a full range from lay people to trained scientists.

Q. Now, have you testified before as a quality, a laboratory quality assurance expert in court?

A. Yes, I have, in courts all over the country and internationally. I've testified in federal

administrative hearings, military hearings, all kinds of things.

Q. And what is the actual field of endeavor that you typically testify as an expert in?

A. In the field of laboratory quality assurance.

Q. Now, where do you live?

A. I live outside Albuquerque.

Q. In New Mexico?

A. Yes.

Q. And did you review items that I provided to you that came from the laboratory in this particular case?

A. Yes.

Q. Now, you're being paid to be here, correct?

A. I'm paid for my time to review data, to travel, to testify, all my time.

Q. What is your rate?

A. 150 an hour.

Q. And do you consider yourself a forensic toxicologist?

A. I certainly am not.

Q. And a specific forensic laboratory, have you worked in one?

A. I have not worked in a laboratory that's sole purpose is forensic testing. In the laboratory that I manage for the Department of Energy, some of the results

may have ended up in court, but, which by its nature makes it forensic, but that wasn't its sole purpose for existence, or its reason for existence.

Q. And you've used gas chromatography before?

A. I have. I've bought the instruments, wrote the specs for them, did the instrument testing to do acceptance testing on the instrument once it was installed in the lab, run samples, and for decades have been reviewing the results of gas chromatography for clients and data users to make sure that they were acceptable.

Q. Now, when you say results, are you referring to the chromatograms which are the pictures of what comes off the machine?

A. That's part of it, a very important part of it. It's -- the result from a gas chromatograph really isn't the number, it's really that picture that you've probably seen.

Q. Now, in this particular case, have you ever visited this particular lab?

A. No, I have not.

Q. Have you ever met Mr. Schwane?

A. No.

Q. Are you basing your testimony today on the data that was provided to you regarding this lab's procedure

methods and testing in this case?

A. That's correct, the materials that were provided by the laboratory.

Q. Now, in talking about different kinds of labs, forensic labs, analytical labs, whatever they are, in the world of I guess forensic laboratories, those would be laboratories that's sole purpose is to test things that might be used in court; is that a correct definition?

A. Yes.

Q. Is there an overriding entity like the USDA or something like that that sort of supervises all of the forensic labs in the United States?

A. No. In the United States the labs that do forensic testing, the crime labs that do testing in various states and localities are typically set up at the local level, at the state level or at the county level, as in this case, or even at the city level. The only big federal labs that you've probably heard of are the ones like the FBI and the Drug Enforcement Administration laboratories, the ATF labs, those kind of things. But for the most part, forensic labs in this country are at the local level, and in the vast majority of cases, they are actually part of the law enforcement arena.

Q. Are labs -- are there various entities that do accreditation of labs?

A. Yes. In the case of forensic laboratories, there are three independent agencies that actually accredit forensic labs. That means that they come in and look at the laboratory and evaluate them and make sure the lab complies with their requirements, and if they do, they issue them a certificate of accreditation that has to be renewed periodically.

The three are ASCLD/LAB, which is the American Society of Crime Laboratory Directors/Laboratory Accreditation Board; there's one called Forensic Quality Services out of Florida; and there's an entity that's called A2LA or the American Association for Laboratory Accreditation. So in this country those are the three agencies that actually issue accreditation to forensic laboratories.

Q. Do the different ones have different -- well, let me see if I understand correctly. Are some of them more rigorous in their requirements than others?

A. That's very much the case. Historically, ASCLD/LAB has used a manual that they wrote themselves that they created that set their requirements for forensic labs for crime labs in this country, and the 2005 version of the ASCLD/LAB manual is the one that this SWIFS lab was accredited to at the time that the testing in this case was done. The ASCLD/LAB requirements are

the least rigorous, the least demanding of any accreditation requirements I've ever encountered in my career. They are recognized as such in the technical community by laboratories as being not very rigorous, and that's been addressed very recently by ASCLD/LAB because they decided they would start complying with the international standards that all the other laboratories comply with.

There are international standards, ISO standards that labs all across the country comply with, and ASCLD/LAB in recent years has been making a transition to requiring the more rigorous standards, but in the meantime they still have quite a number of labs in this country that are accredited under what they call the legacy program. They are old standards that were significantly less demanding for the laboratories to comply with.

Q. Could you tell by the paperwork, accreditation paperwork that was turned over, where SWIFS stood in that process at the time of this testing?

A. At the time of this testing, they were accredited by ASCLD/LAB to the 2005 version of the ASCLD/LAB manual. They had stated their intention to try to come up to speed, to try to put in place all of the controls necessary to comply with the international

standards, the ISO standards, but they weren't there yet. And I would certainly agree with that based on my review of the records in this case.

Q. Now, they have protocols and procedures at SWIFS that are there that they go through some sort of manual or something that they wrote, correct?

A. That's correct. The laboratory, you have the written procedure that describes how they do their forensic blood alcohol testing.

In this case, they had a procedure that was put in place in September of 2012 that they should have been following at the time that they were testing this sample in December of 2012, and that procedure is very much like -- it's like a recipe for testing. You want to be sure that you've written down all the key steps, you know, if it's necessary to grease the pan or if it's going to stick, then you better tell the person in the recipe to use a greased pan.

Well, the very same thing applies in the laboratory. If it's important to getting good results, then you better write it down in your procedure and have all the detail necessary so that the next analyst can come along and do it in exactly the same manner, that you're all following the same procedure so you get the same result.

Q. You want to look at the ASCLD labs that are accredited in the United States, I'm sure there are a certain number of them.

A. Yeah, on the order of close to 400.

Q. About 400 labs?

A. Nationally.

Q. If you were to think of them as like a school district, within that accreditation, would there be some labs that were more high performing and others that are more low performing, kind of like schools; we have some schools in the school district that are more high performing and others that are low performing?

A. Sure. There are -- over the course of 30 years of looking at laboratories, I have seen really great labs and I have seen some really terrible laboratories. And there are characteristics of great labs, the kinds of controls and the scientifically inquisitive nature, you know, they are really curious and try to figure things out, and there are labs that are kind of just making the donuts, just following the steps, just cranking the samples through.

MR. MCDONALD: Your Honor, I would object to the narrative form of the response and the lack of foundation for this testimony.

THE COURT: All right. Sustained. Let's

move on.

Q. (BY MS. GRANT) So there is a difference?

A. There is a difference.

Q. So you had a chance to go through the setup of this particular instrument that was used in this case, and I think they call it their validation, correct?

A. Yes.

Q. And did the validation occur when they purchased this instrument, and I think it was 2006 or something?

A. In 2006, they previously had been using a different model of instrument from a different manufacturer. In 2006 they purchased instruments, two instruments from a company called Shimadzu, and were putting those in place in the lab, and so they did what's called a method validation study to essentially test their method and see whether or not it was going to work properly for the determination of blood in ethanol -- or ethanol in blood.

Q. And I think in this case, if I'm looking at the paperwork correctly, this was all done on what they refer to as Instrument B?

A. Yes. That's what's relevant to this case was Instrument B. They did some testing on A as well.

Q. Okay. So just talking about Instrument B, did you go back and look at the methods they used to set up

this machine from the get-go?

A. The recipe, if you will, or the --

MR. MCDONALD: Your Honor, at this time I object under Rule 401 and 702 as to foundation of this testimony.

THE COURT: Can I see the lawyers, please.

(At the bench; off the record)

Q. (BY MS. GRANT) So, Ms. Arvizu, you were able to look back over that testing?

A. Yes. Well, the report that they issued.

Q. And then you went forward to more recent times and the things that that instrument was doing, correct?

A. Yes, in 2012.

Q. All right. Well, let's talk about why this matters. I mean, what was the point of all of this? When you buy a gas chromatograph, does it come out of the box knowing where ethanol is?

A. No, it does not.

Q. How is the machine to know when something burns off that little flame at the end of the testing procedure, that, hey, this is ethanol? How does it know that?

A. The machine never really knows that. The machine only knows what you as the responsible analyst tell it. Because you described it as a flame burning.

That's really all the detector is, it's just a flame sitting there waiting to see what comes through the column. And when any compound, any old hydrocarbon comes through the compound and hits that flame, it just burns it up. So it can't tell if it's one compound or if it's a mixture of two compounds. All it says is something came out and I'm going to burn it off and give a peak in response. So in that respect, it's really not a very clever detector. It just can say something is there and it can't tell you what it is.

The way we as scientists try to figure out what that is, is by essentially teaching the instrument. That is, you take known solutions of known origin and purities, and we know exactly where this came from and exactly where it is, we've got a traceable system, all the records exist, and we analyze that sample and we see where that sample of ethanol comes through my system. And I figure out, oh, it takes ethanol one and a half minutes to go through my system the way I've got it figured. That's an indication that anything that comes through at one and a half minutes, that instrument is going to say it's ethanol.

But the problem is that there are thousands of volatile organic compounds. Ethanol isn't the only thing that takes one and a half minutes to go through the

instrument. Other things will also come through at the same time. So the way we get around that in chemistry is by having a second column that has a little bit different chemistry inside, so it mixes things up. Something that used to come through really quickly, now it can come out in only a minute, now it interacts with this long column and it takes a long time to go through and now it takes three minutes to come out of the column.

So if I get peaks at both of the expected values as the retention time in my unknown sample, then I can say I've identified ethanol, I've identified that compound.

Q. Now, you talked about peaks. Peaks would be the representation of what's burning with a flame, correct?

A. Yes, yes.

MS. GRANT: May I approach, Your Honor?

THE COURT: Yes.

Q. (BY MS. GRANT) I want to show you what has been marked as Defendant's Exhibit 15 and ask you if you can tell me what that looks like to you.

A. It looks like a chromatogram. That's just the peaks that we have been talking about. This is what the instrument prints out after each and every sample that goes through the column.

Q. So in looking at this picture, would you think

that this would help the jury understand what we're talking about if we could point to various things on it to demonstrate the concept?

A. Yeah, I think it would.

MS. GRANT: Your Honor, I am tendering Defendant's Exhibit 15. The State has previously reviewed it before trial today, and ask that it be used as Demonstrative 8 in this case.

MR. MCDONALD: No objection, Your Honor.

THE COURT: It's admitted.

(Defense Exhibit No. 8 admitted)

MS. GRANT: Your Honor, I would like to publish this.

THE COURT: Granted. Would you like the lights dimmed?

MS. GRANT: That would be great.

Q. (BY MS. GRANT) All right. So, Ms. Arvizu, in just looking at this picture, this is sort of a picture of what you're talking about with regards to the chromatograph and peaks, correct?

A. Yes.

Q. Now, this line that is down the middle of this one, indicating I guess that the peak is symmetrical; is that correct?

A. Right.

Q. Why is that important?

A. This is what's called as the science of chromatography, and chromatography is nothing more than a separation science. And so what we are trying to do is put in place a system for ensuring that we get enough separation between in this case this peak and this peak, and we compare that by what's called retention times. Oh, I was trying to write but it didn't. This one --

Q. I did that.

A. Oh, thank you.

This one, it says injection right here. That means that's when the sample got injected to the instrument. And then the clock starts and we start monitoring how long it takes.

In the very first part here, the detector doesn't see anything, there's nothing there, nothing there, nothing going through. But then when it gets to here, right there, it starts saying oh, there's something here, and it burns and burns and burns, and more and more comes through, because it's not just one spot, it's a whole slug of this stuff coming through. And so I get a peak. That peak in this case is centered around this almost at the middle retention time. So that's when we talk about a peak that comes out at one minute, that would be one minute, the center of that peak.

If you have good chromatography, good separation, your system's been working the way you want it to, this is what's called the bell curve, like the old bell curve you used to get graded against in school. Half of the scores are higher than the middle and half of the scores are lower than the middle, and it's a nice even shape.

What we do when we're trying to figure out how much of something is present is we measure the area under that curve, and that's what this one is trying to show, that the computer in the gas chromatograph is actually measuring the area under that curve, because it's the area under that curve that tells you how much of the stuff is present.

So we get information about what is there by time, how long it took to come off of the column, and we get information about how much is there by the area under the curve.

In order to say anything like how much ethanol is present in a sample, you have to be able to do both of those things. You have to be able to identify ethanol and you have to be able to be sure that it's ethanol and only ethanol that the instrument is detecting when it measures the area under that curve.

Q. So you're familiar with my Chex Mix example,

correct?

A. Yes, I am.

Q. Okay. So going back to the Chex Mix idea, see, if you've got separate peaks, you're hoping in the best case scenario, doing chromatography, that you're separating out the pretzels, the Rice Chex and the Wheat Chex, and everything is separated from each other, and then once they're separated, you can figure out how much they weigh or how much is there?

A. Exactly.

Q. Okay. Now, because the instrument doesn't come out of the box inherently knowing this, how do you tell it ethanol comes out, even though pretzels are here, the Rice Chex is here? How do you tell the machine to know those things?

A. That's what the laboratory was doing when it did its method validation study back in 2006. What they did was, for example, they did a selectivity study where they --

MR. MCDONALD: Your Honor, I'm going to renew the State's prior objection.

THE COURT: Let's move on.

Q. (BY MS. GRANT) When you go back and you review calibrations, you've heard that the calibration on this particular instrument was done in November, correct?

A. Correct.

Q. Okay. And then this testing was not done until September -- or no, excuse me, December, but the calibration, most recent one was in I guess November 21st?

A. November 21st, yes.

Q. Now, when they do that calibration, how do they do that?

A. The calibration of the instrument is done by using what are called calibrator solutions. That's solutions you're going to need to teach the instrument. So you use the solution. This should be a known origin, we know where it came from and we know exactly what its concentration is. And we inject that known solution to the instrument and we see what kind of a peak we get in response, we see what kind of location and the area of the peak in response. And then we do a whole series of these and we get a calibration curve, and we use that to determine how much is present in an unknown sample.

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.

And that's why this was a problem in this

particular case, because they calibrated the instrument weeks before they ran the samples in this case.

Q. Now, when you are talking about the calibrators, that you take these knowns, and you're using the word known, how do you know? I mean, how do you -- like if I had my food scale and I'm going to say I'm going to make sure this scale is working and I'm going to get my known bag of pretzels and put them on the scale, how do I know when I'm looking at half a pound of pretzels that that's what's really in that bag?

A. The way we use that in laboratories is we use what are called reference materials, standard reference materials, and these are materials that are prepared very, very carefully and with all kinds of controls on the preparation process. We use devices that are called pipettes to measure out the volume. We use reference materials that are of known and documented purity. They are traceable to the National Institute of Standards --

MR. MCDONALD: Your Honor, at this time I'm going to object under Rule 701 and 401 and say this is beyond the scope of admissible testimony.

THE COURT: Well, let's start tying it. Let's move on.

MS. GRANT: May I approach, Your Honor?

(At the bench; off the record)

Q. (BY MS. GRANT) Ms. Arvizu, would you agree that you've got to calibrate the machine before you can use the machine?

A. If you don't calibrate it, you have no way of figuring out the quantity of anything that's present.

Q. When you're doing these known solutions, when you're going to calibrate this instrument, in November of 2012, and they are running them through -- I'm going to show you Defendant's Exhibit 11.

MR. MCDONALD: I'm going to again object, Your Honor. This is outside the scope of permissible testimony. It does not deal with a single exhibit and control.

THE COURT: Let me see the lawyers.

(At the bench; off the record)

Q. (BY MS. GRANT) Ms. Arvizu, in front of you, Defendant's Exhibit 11, can you identify what that is?

A. This is a certificate of analysis by -- that was produced by the company that prepared the ethanol standard that this laboratory used to make their calibration solutions that they prepared in 2012 to calibrate this instrument, the calibration that they used to run these samples. So this was the known ethanol solution that they used to make the calibration standards that they taught the instrument from.

Q. Okay. Is there anything about that certificate that caused you concern?

A. There is, because the calibration solutions were prepared in September of 2012. And according to the manufacturer, this particular material expired in January 19th of 2012.

Q. And why -- okay, so it expired. Why is that important?

A. In the laboratory we set shelf lives of all of the consumables that we use essentially to protect us and make sure that it's what we think it is, much the same way that there's a shelf life on the milk in your refrigerator, that protects you from drinking spoiled milk. It doesn't mean that it's going to make you sick the day after you drink the milk, but it might if you didn't leave it in the refrigerator the whole time or if you didn't store it properly.

And much the same thing applies in the laboratory. The only way we as scientists can have confidence that the measurements we're making are reliable is to ensure that all of the materials are used within their shelf life and that they are stored properly and that they are used properly.

Using a reference material nine months after its expiration date is not acceptable practice and it

renders their calibration unreliable.

Q. Now, when the score matters, when the result matters, when the measurement matters, do you use expired reference materials in your calibration?

A. You should not, no.

Q. Now, when they did the calibration in November 2012, that data, did they calibrate the machine? Did they tell the machine here is the way you're supposed to read whatever comes off the column, whatever burns the flame, was based on using the material that was expired?

A. That's correct.

Q. So then when a test is done, relying on that historical data in November, when a test is done in December, it's still being impacted by that error?

A. That's correct.

Q. And what was the policy of this lab in regards to how often they calibrated this machine?

A. At the time this work was done, they were calibrating their instrument only once a month. That's very infrequent. It doesn't meet national standards. The Society of Forensic Toxicology is -- published guidelines in 2006 to tell all forensic toxicologists what they considered their minimum guidelines for doing acceptable quality work, and they require calibrators in every batch. And I've certainly reviewed results from

labs all over the country, many, many, dozens and dozens of labs, and it's extremely unusual to see a lab that does not calibrate daily with every batch.

Q. Now, and a batch is the tray full of samples that all run; am I understanding what a batch is?

A. Yes. We don't, in the lab, we don't just run one sample at a time. Typically you get a whole batch of samples, a set of samples that are all prepared at the same time and tested at the same time under the same conditions, and we call that a batch.

Q. So this typical chromatogram is what you would consider what good chromatography should look like, because it's smooth line, identifiable peaks, symmetrical peaks? Correct?

A. Yes. It's a schematic. It's not a real chromatogram, but generally it shows the principle.

Q. Now, calibration is one thing. Then you have what are called controls. What is a control?

A. 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. So just like it was really important that the calibrators be of known origin and purity, we have to

really know about the calibrators, we also have to really know about the control samples that we're using to check the instrument.

Q. Now, are the control samples made differently than the calibrators?

A. In fact, they -- it's very important that they be made differently than the calibrators. If you use the same solution that you calibrate as the control sample, there are all kinds of problems you would never be able to detect, so it's really important that the control samples be prepared separately from your calibrators. The basic practice in terms of how they are diluted is the same, but they need to be done starting with different material.

Q. Does this lab do that?

A. They actually purchase their control materials from an external provider, which is a good practice. The place that they purchase them from is a very reputable, respected manufacturer of these materials.

Q. When you open those materials, make your control, your control batches or whatever you call them, is there any problem once you've opened them that you have to be aware of?

A. Yes. When you buy these materials from this company, it's called Cerulean, they provide you with a

certificate of analysis. They're an accredited provider. It's got a lot of detail on this certificate. It gives you a chromatogram showing you what the DC results were. It gives you a lot of detail about how they prepared their material.

And these are provided in little glass vials. They are actually solid glass. There's no lid to unscrew like on a bottle. You actually have to break off this little lid and open glass that way. And as the manufacturer warns you on their certificate of analysis, you have to use it immediately after opening. You can't open it and then use it one day and use it the next day and keep using it day after day because it's only valid and they only warranty it as being good immediately after you open it, because these reference materials are made to such precise and exacting requirements.

Q. In this case --

MS. GRANT: May I approach, Your Honor?

THE COURT: Yes, ma'am.

Q. (BY MS. GRANT) You have a certificate, right, that was provided to you?

A. Yes, there was a certificate of analysis for the controls that this laboratory used.

Q. And that was from Cerulean, correct?

A. Yes. Cerulean was the manufacturer.

Q. And it was Defendant's Exhibit 18; is that right?

A. Yes. This is actually a two-page document. There's another page.

Q. With a chromatogram attached?

A. Yeah, that's correct.

Q. Now, on that particular document, does it explain what you were talking about about the shelf life or the expiration and those sorts of things?

A. It does. It says right at the very top expiration date has been established through realtime stability studies and applies to the ampoules stored unopened at the recommended storage condition.

So they give you an expiration date here, January 2017. Gosh, that's a very long expiration date. As long as this is stored refrigerated in that little sealed glass ampoule, then it's good for a very, very long time. But the minute you open it, you've got to use it right then or it's no longer any good.

It's kind of like the soy milk in my refrigerator has an expiration date that's long, a couple of months, but once you open it, you've got to use it within a week or it goes bad. So the expiration date only applies to the unopened material. This is the same idea. The expiration date only applies to the unopened

material. They only warrant it to -- as being good through its expiration date when it's unopened.

Q. Now, in this lab, were you able to determine when they opened it and when they used it and when they discarded it?

A. No. They did not document when the ampoule that they used in this case actually was opened.

Q. So you have no way to know what happens with these?

MR. MCDONALD: I'm going to object under 401 and 702 again. She just -- there's just no foundation.

THE COURT: Sustained. Let's move on.

Q. (BY MS. GRANT) There's no dated trail, is that correct?

MR. MCDONALD: I renew the same objection, Your Honor. The witness is speculating.

MS. GRANT: I didn't ask for speculating. I just asked for a paper trail, Judge.

THE COURT: Let's move on.

Q. (BY MS. GRANT) So then did that cause you concern?

A. It does.

MR. MCDONALD: Your Honor, it's the same question.

THE COURT: Sustained. Let's move on.

Q. (BY MS. GRANT) Another -- and there were these controls that we're talking about, there were several of them in the batch run where Josh's sample was included; is that right?

A. There were two different controls, one a .08 and one a .2.

Q. Okay. Now, best practices with regards to the soft guidelines or any others --

MR. MCDONALD: Again, Your Honor, this is outside the scope of permissible testimony. It should be limited to the negative control sample.

THE COURT: Let me hear the question again.

Q. (BY MS. GRANT) When you're running a batch run, is it recommended that you run a what's called a resolution matrix, that's one term, at the beginning of the sample?

A. It is. This is what's called a volatile mix sample or a resolution check sample, and it evaluates --

MR. MCDONALD: Again, Your Honor, there's no scientific basis for this testimony.

THE COURT: Let me see the lawyers.

(At the bench; off the record)

Q. (BY MS. GRANT) The term resolution matrix, I think you called it something else.

A. Volatile mix. It goes by a lot of different

names, but in practice, what it is, is a solution that has a number of known volatiles that are known to be present in blood samples, and it's a check on whether or not -- oh, it's gone, but whether or not the peaks are actually separated under the conditions that you are running your samples, or whether they are on top of each other and you won't be able to tell the difference.

Q. Okay. So if you go with the Chex Mix example, if I stick the whole bag of Chex Mix in, this thing will show whether it pulls everything apart?

A. Whether the Rice Chex and the Wheat Chex are separate piles or whether they are mixed together so that you can't tell them apart.

Q. Okay. Now, when this batch was run, was there a resolution matrix or anything demonstrating that at the time it was testing these samples, not just Josh's but other people's, that it was able to separate out volatiles?

A. No.

Q. Is that unusual in your industry?

A. It is very unusual. Again, I look at blood alcohol results from labs all across the country, and these are routinely run and in most state programs routinely required.

Q. So when this batch was run, there's nothing that

can demonstrate this instrument and tell the difference between ethanol and anything else?

A. Specifically, there is no way to tell a difference between ethanol and acetone.

Q. Now, the beginning of this run was a control, and now I think it was a .20, if I remember correctly, and then maybe a .08, and then a bunch of people that had samples in jars, correct?

A. Correct.

Q. And those are called headspace vials?

A. Yeah. The blood samples that are received by the laboratory are little 4 mil, the ones in this case were little 4 mil blood samples. That's not the sample that gets injected into the instrument. What's called an aliquot or a small amount of that sample, just a couple of drops of that sample goes into a 20-milliliter vial along with internal standard, and that's what goes on the auto sampler for the instrument.

MS. GRANT: May I approach, Your Honor?

THE COURT: Yes. Yes, ma'am. You may proceed.

Q. (BY MS. GRANT) I'm going to show you what has been marked as Defendant's Exhibit 22, which were used for demonstrative purposes yesterday.

THE COURT: Actually, you know, Ms. Grant,

let's take a break. I need a break. Let's take a break.

(Jury ushered out)

(Recess taken)

THE BAILIFF: All rise.

(Jury ushered in)

THE COURT: All right. Be seated, please.

Ms. Grant, go ahead.

MS. GRANT: I had just asked to approach. Is that okay?

THE COURT: Yes, ma'am. Go ahead.

MS. GRANT: All right. Thank you.

DIRECT EXAMINATION (cont'd)

BY MS. GRANT:

Q. Ms. Arvizu, on Defendant's Exhibit 22, this is a headspace vial?

A. Yes.

Q. Okay. And I'm going to show you what has been marked as Defendant's Exhibit 33. Can you tell me what this item is?

A. Yeah. That's an Eppendorf pipette. It's a very, very common piece of laboratory equipment, and it's used for making very, very careful measurements of a particular volume of liquid.

THE COURT: Could you spell that, Eppendorf.

THE WITNESS: E-P-P-E-N-D-O-R-F.

P-I-P-P-E-T-T-E.

MS. GRANT: Your Honor, I would like to offer what I've previously shown to the District Attorney's office this morning as a Demonstrative 8.

THE COURT: I'm sorry. Was it 33?

MS. GRANT: Thirty-three.

MR. MCDONALD: The State has no objections so long as its use is limited to demonstrative.

THE COURT: Demonstrative only. Go ahead.

MS. GRANT: May I reapproach?

THE COURT: Yes, ma'am.

Q. (BY MS. GRANT) Ms. Arvizu, can you tell the jurors how you use this instrument.

A. This instrument actually is used in the laboratory with little disposable plastic tips that are manufactured specifically for this device, and the little tips go on the end here. So when you're worrying about contamination control, you also have to worry about where you're storing your tips and how they might get contaminated before you use them. You got to protect them too. But these pipettes are used, they have a couple of different stop settings. You can't tell it but as I hit it, as I push down this plunger, there are several different stops. You put the little plastic tip on the end, and then holding it in a perfectly vertical

position, and putting the tip in just about a millimeter or a couple of millimeters into the solution, you can withdraw and essentially suck up a measured volume. And they are designed what's called to deliver. That means if they are used properly and you use the right technique and everything, then the amount you squirt out is very accurate and very precise.

Typically the tolerance or the inaccuracy on one of these is a fraction of a percent. They are very good if they are used at the right temperature because they are only calibrated at a particular temperature, and they use a good technique, and if you store them and maintain them properly.

When a lab like Cerulean makes up their reference materials, they use these devices to make their dilutions, and they check the calibration of this pipette immediately before they use it to measure out the unknown. So they check it and they make sure it's working properly before they use it to prepare a reference material.

Q. Now, did you get documentation from SWIFS about their pipettes?

A. Yes, I did.

Q. Now, do they have different pipettes that are used for different things?

A. Yes. They have -- this particular one is a 50-microliter pipette, so it's only capable of measuring out 50. They also have some that are variable volume, you can set them at different quantities.

Q. And do pipettes have to be calibrated?

A. They absolutely have to be calibrated under international standards, they must be calibrated prior to use. Externally, an external calibration lab should calibrate them at least once a year, and then the lab should periodically check them as they are using them because these are really precision instruments. It looks like just a hunk of plastic, but they are subject to being beat up in use and getting out of calibration, and they need to be stored and used properly to prevent that. If you're using them to prepare reference --

MR. MCDONALD: Your Honor.

THE COURT: Well, let's move on.

Q. (BY MS. GRANT) Okay. Did you receive calibration certificates about some of the pipettes at SWIFS?

A. Yes, I did.

MS. GRANT: Okay. May I approach, Your Honor?

THE COURT: Yes.

MR. MCDONALD: Your Honor, again I renew the

State's objection under 702, 401, this is beyond the scope of admissible testimony.

THE COURT: Can I see the lawyers, please.

(At the bench; off the record)

Q. (BY MS. GRANT) With regards to Defendant's Exhibit 13 which is already in evidence, is this one of the calibration certificates for one of the pipettes that was being used at SWIFS?

A. Yes.

Q. Is it your understanding it was one of the ones for reference solutions or controls?

A. Yes.

Q. When it was checked in August, was it found that it was out of tolerance?

A. Yes. When they had an external company check the calibration of this, they checked it when they received it from the laboratory and found it to be what's called out of tolerance; that is, it was not delivering the volume that it should have been delivering when it was received. They calibrated it, got it back performing within specifications, and gave it back to the laboratory. The laboratory put it in use. And then they used it for six months before they did an internal check on it. So their practice in the lab was to do one check a year internally and to do it at the midpoint between

the external calibrations.

Unfortunately, that doesn't address the fact that it was found to be out of tolerance. So their usage practices were such that it was going out of spec, and they would never have known that because they wait so long before doing a check.

In addition, when they do their internal checks, their tolerance is much larger. They accept much more variability in the results than the external provider.

Q. When results matter, is this the best practice to engage in?

A. It is not.

Q. Now, there's a thing called an internal standard that Mr. Schwane mentioned when he was here. Can you explain what an internal standard is?

A. In GC, use of an internal standard in a blood alcohol analysis is best practice, that's what laboratories should do, and it means that in addition to putting a little bit of blood in this sample, they also put a much larger quantity of what's called an internal standard. It's a compound that's chemically similar to what you're testing for, ethanol, but it doesn't interfere chemically with the ethanol. And what we do is we add a known volume of internal standard to each and

every sample in the batch. We add it to the blank, we add it to the control samples, we add it to the calibrators, we add it to the unknowns. And -- well, my sheets are gone, but what happens is that means that there should be a reference peak for the internal standard in every chromatogram so I can make my quantitation by comparing the unknown ethanol peak to how big it is in relation to that constant propanol peak. It's a lot of chemical reasons why that is a really good practice, and that is the practice in this laboratory to use an internal standard.

Q. How important is it that your internal standard be, when you're putting it in that little glass jar, be very, very precise?

A. It's extremely important because the whole principle of using an internal standard to quantify and figure out how much ethanol is present is based on the fact that you have to have exactly the same volume of internal standard in every one of these vials. If you have a lot of variability in that internal standard, then your results simply cannot be reliable, because the whole principle is based on having a fixed quantity present in every single vial.

Q. Now, they -- according to the logbook from SWIFS, did they prepare a brand new batch of internal

standards in November of 2012?

A. Yes.

Q. I believe, if I'm not mistaken, it was November 16th.

A. That's my recollection.

Q. And then they recalibrated, they had recalibrated the machine on the 21st; that was the calibration date?

A. The calibration that they used in this case was November 21st.

Q. But do the records indicate that they actually put the new internal standard into service on the 26th?

A. That's correct.

Q. So why is that important?

A. The reason that's important is they use a completely different lot of internal standards to calibrate their instrument than they did to make their measurements. Their actual practice did not comply with their own procedure. Their own procedure says every time you use a new internal standard you must calibrate the instrument. So they were still using the old one when they ran this sample. Again, that's the whole foundation for determining how much ethanol is present in your unknown samples.

Q. When the results matter, is that the best

practice?

A. It is not.

Q. What is a Dispensette?

A. Dispensette is a trade name for a device that's called a repipettor, and it's used in laboratories. It's a very common piece of equipment, and it's the kind of equipment that essentially would screw on top of a bottle. There would be a little device on top of the bottle, and then you would dispense out a fixed quantity of what's in the bottle by pushing down on the lever on top, and it would squirt out the side. It's very commonly used in laboratories for dispensing what are called reagents. That's something that's used in the reaction, but it's not critical for standards.

Q. Okay. So like if I have a shampoo thing in my shower that I can pump out shampoo into my hand, that's basically what it does, it pumps out --

A. Yes, basically, yes.

Q. -- a substance?

A. Yes.

Q. Whatever you hook it to?

A. Exactly.

Q. Okay. So you said before reagents, when you don't have to be particularly precise, you can just pump that thing down?

A. Correct. There's a significant difference between a Dispensette, which is designed for this kind of repetitive thing, and an automatic pipette in terms of their accuracy and their precision. So these Dispensettes have -- are theoretically capable of achieving accuracy tolerances on the order of a couple of percent, where this is a fraction of a percent. So in my experience, I have never seen any lab except this lab use a Dispensette to dispense a standard reference material ever in 30 years. I've never seen a laboratory do that.

Q. And they are doing that at SWIFS?

A. They do that at SWIFS.

Q. Now, is there a difference between precision and accuracy?

A. There is a very important difference. They are not the same thing. Just because the result is precise doesn't mean it's accurate.

Q. Well, what's the difference?

A. Accuracy speaks to the -- whether or not a result is close to the true value, whether there is any bias. Precision simply speaks to whether or not you get the same result over and over and over. You can have a result that is very, very precise, that is you get the same answer over and over and over, but it's still very far from the true value.

Q. If I were to take a -- and put it on here, piece of paper, and I want to draw a bull's eye for darts, I'm not a very good artist, and I threw darts and hit here, here, here, here and here, now, they were all very close together, would that be a description of precision?

A. That's very good precision because I'm getting a repeatable measurement, the same thing over and over, but it's not very accurate. I'm not hitting the target, so it's precise but not accurate. Often people think that because I get the same result over and over, it must be the right thing. This is the fallacy in that line of thinking. Just because you get the same thing doesn't mean it's accurate.

MS. GRANT: May I approach, Your Honor?

Q. (BY MS. GRANT) You've seen the four chromatograms from this testing sequence?

A. Yes.

Q. And they involve basically one jar of prepared Josh Brent blood specimen in one slot in the carousel?

A. Yes.

Q. And then another one later on in another carousel?

A. Correct.

Q. In the first jar, when it gets sucked into the machine, the air above it gets sucked into the machine,

it splits and goes through two columns; is that right?

A. That's correct.

Q. So it creates two chromatographs?

A. Correct.

Q. And that's where you get channel 1, channel 2?

A. Yes.e

Q. And then the second one, when its turn comes up later on down the road, same thing, splits off, you get two chromatograms?

A. It goes through the same two columns.

Q. And here you get a .189, .189, .189, .190?

A. Yes.

Q. Would that be a definition of precise?

A. Those are precise measurements because replicate measurements give you essentially the same result.

Q. Now, if I were to say because of these all four are very precise, does that tell you anything about accuracy?

A. No.

Q. You have to look deeper?

A. Correct.

Q. Now, with regard to running them all together in one tray in the same testing sequence, is that following SWIFS protocol or was it not following their protocol?

A. That does not follow their own procedure that

was put in place in September. Under their own procedure they were supposed to run the two samples in two different batches. A sample and its duplicate should have been run in different batches. That, in fact, as written in their procedure, is a good practice that is called for in standards, actually recommend that you do that. Their own procedure says that they should do that, but that was not done in this case.

Q. So a batch, if you have a tray full of vials like those, a whole tray of them, and you say I'm going to call the first half of it batch one and the second half of it batch 2, is that two batches?

A. No.

Q. That's not two batches?

A. That's not two batches, that's one batch.

Q. Okay. Is two batches when you run an entire tray and then later run another tray?

A. It's --

MR. MCDONALD: Your Honor, at this time I'm going to object as to relevance. There's absolutely no foundation why this testimony from this witness is relevant.

MS. GRANT: If they are violating their own protocol and procedures --

THE COURT: Ma'am, I don't need any sidebar

comments. I'm just going to rule on the objections. Okay?

I'll sustain the objection. Let's move on.

Q. (BY MS. GRANT) So with regards to precision and accuracy, those test results alone tell you nothing about accuracy?

A. That's correct.

Q. Now, having done this as long as you've been doing it, and reviewing all of these labs that you've gone through, you talked about in the beginning the idea of the school district with the high performing school and the not great performing school. What is your opinion of SWIFS in regards to their performance in producing valid accurate scientifically reliable results?

MR. MCDONALD: And again, Your Honor, this is outside the scope of the admissible questions.

THE COURT: I'll sustain. Let's move on.

MS. GRANT: Just a moment, Your Honor.

I'm going to pass the witness.

THE COURT: All right. Folks, we're up against the lunch hour. It's noon, it is straight-up noon, so we'll break again for an hour and 15 minutes, and resume at 1:15. We'll resume at 1:15. Okay.

THE BAILIFF: All rise.

(Jury ushered out)

(Lunch recess taken)

THE COURT: All right. Is everybody ready to go? Folks in the gallery, if I can get your attention a little bit. The jury has been complaining about the number of in and outs from observers, people coming and going. So, you know, I put something out on the door about that, about please do your best to minimize your time coming in and out. If it looks like there's a whole bunch of people going in and out, then we may just basically close the courtroom so once you're in, you're in until next break, and obviously you'd be out until next break as well. So please do your very best to minimize the number of ins and outs. Thank you.

THE BAILIFF: All rise.

(Jury ushered in)

THE COURT: All right. Ms. Grant, go ahead.

MS. GRANT: Judge, I think I passed the witness.

THE COURT: Oh, I'm sorry. You did.

Cross-examination.

MR. MCDONALD: The State has no questions for this witness, Your Honor.

THE COURT: Okay. Ma'am, you can step down. May this witness be excused?

MR. MILNER: Without objection from the

State, well, subject to recall by the Defense.

THE COURT: Ma'am, you can step outside. Thank you.

THE WITNESS: Thank you.

(End of excerpted testimony)

THE STATE OF TEXAS * IN THE CRIMINAL
VS. * DISTRICT NO. 1 OF
JOSHUA PRICE-BRENT * DALLAS COUNTY, TEXAS

I, Crystal R. Jones, Official Court Reporter in and for The Criminal District Court No. 1 of Dallas County, Texas, do hereby certify that the following exhibits constitute true and complete duplicates of the original exhibits, excluding physical evidence, offered into evidence during the Proceeding Title in the above-entitled and numbered cause as set out herein before the Honorable Robert D. Burns, Presiding Judge of The Criminal District Court No. 1 of Dallas County, Texas.

I further certify that the total cost for the preparation of this Reporter's Record is $713.00 and will be paid by Honorable Macy Jaggers.

WITNESS MY OFFICIAL HAND on this, the 25th day of February, 2014.

_____

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