particular bullet has a left-hand twist and this particular bullet has a right-hand twist. There's no way possible that these two bullets could have come from the same source. They're eliminated right there at that moment based on class characteristics. Yugo compared to a Cadillac.

THE COURT: I got it.

THE WITNESS: Two casings. Same idea, class characteristics. This particular casing has an elliptical type firing pin and it also has a rectangular firing pin aperture flow back. That's very typical of a Glock, for example.

This casing has a round firing pin impression, right? Right off the bat, there is no way possible that these two fired casings came from the same gun because they have different class characteristics, so definitely two sources you're dealing with.

So let's say that you actually had two casings that both had rectangular firing pin aperture flow back and had elliptical type firing pin. Let's say you had two of them. Then you would move from a Level 1 analysis to a Level 2 analysis. And then this is where individualization would occur. All the class characteristics are the same, and then you will evaluate through a comparison microscope

the two items.

And this is a picture of a comparison microscope. Basically, you have a left-hand stage and a right-hand stage, on a comparison microscope. All that it is really is two microscopes joined together by an optical bridge so you can view those two items under one field of view. And then you can move between those two views with a hairline.

And what we have here is an example of an identification based on breechface marks. These breechface marks are not continuous across the whole surface, they're not evenly spaced, and therefore, can be used to make an identification. But an examiner wouldn't just stop there. They would also look at firing pin impressions, chamber marks and other areas of casings.

So what are the range of conclusions that can be rendered by a firearm and toolmark examiner? They could make a conclusion of identification, they could make a conclusion of inconclusive and they could make a conclusion of elimination.

Let's start with identification. If the quality and character of the toolmark has sufficient detail, an identification can be concluded based on the correspondence of those

individual characteristics.

Here are some examples of identifications based on individual characteristics. These are examples. This one is from a pair of two -- or a pair of toolmarks. One is made from a tested bullet -- from a known bolt cutter, one might be an unknown, and the markings are seen to match across this hairline. These parallel markings do not -- are not going across the full length of the working surface and they are also not evenly spaced in appearance, okay? So they can be used. These -- these two examples are from -- there's a right-hand side and a left-hand side, so two different items are being viewed here, are from a firing pin after shearing from a Glock pistol that is seen on casings that are fired from Glocks. And an examiner could look at that shearing and use that for identification. Again, the shearing does not cover the entire working surface from one area to another and it is not equally spaced in appearance, so therefore, it can be used. And, again, the examiner wouldn't stop there as far as firearms are concerned. They would look at other areas as well.

Inconclusives. If the quality and character of the toolmark are lacking, an examiner may not be

able to make an identification or elimination. In this case, an inconclusive result would be the most appropriate.

So, again, here we are looking at two items under one field of view through a comparison microscope. Here's the hairline. What we're looking at are two bullets. And these two bullets -- in particular, on these two bullets, we're looking at land impressions. The width of these land impressions are the same. Therefore, they share the same class characteristics. So that's why it moved up to this Level 2 analysis on a comparison microscope. But there are no individual characteristics seen on the surface of these bullets. Therefore, the only conclusion that could be reached is an inconclusive result. In other words, these two bullets could have come from the same gun, or they might not have come from the same gun. It's inconclusive. They share the same class characteristics, but there are no individual characteristics to make an identification or an elimination.

BY MR. BAKKEDAHL:

Q. Let's just go past this one. I think we made the point on that.

A. Okay. All right. So an elimination. If significant disagreement in class characteristics exist, an elimination conclusion would be the appropriate response. If disagreement in individual characteristics of an exceptional nature exists, an elimination conclusion may be the appropriate response as well.

So here's an example of an elimination based on class characteristics. Very clear, very different.

Here's an elimination from toolmarks based on class characteristics as well. Here's the question mark, here's the questioned tool. This mark has a -- this tool has a big gap in it. So any toolmarks made with this tool would also have this gap present. So there would be a striated mark the length of this part and a striated mark the length of that portion or that prong of this crowbar. This toolmark is continuous; doesn't have any gap, and this toolmark is longer in length than any one of these prongs. Therefore, this toolmark could not possibly be made this end of this crowbar.

Let's talk about some sufficient agreement that is seen. What I have on the top of the screen here are two examples of identifications made between two casings, and I'm using Glock casings in this example. And I'm using specifically the firing pin aperture shearing. Here's a clear indication of individual characteristics matching.

You see the parallel lines going across. Again, you see that here in this example.

You could also have a situation where all of the class characteristics are the same, but the individual characteristics are different, which would then lead to an elimination result, and that is seen here. There is a lack of sufficient agreement between these two. All right? You could actually see that -- that they're not actually -- that the marks are not actually flowing into each other very well.

So we talked about some -- some of the examination procedures. Now let's talk about the basis for firearm and toolmark identification. We'll look at standards of identification, objective versus subjective examination and what makes an identification possible, and last, but not least, the significance of conclusions.

THE COURT: Hang on just one second, Mr. Hernandez, before you get started.

Can I have you all approach real quickly?

Just bear with me one second, sir.

(Conference at the bench as follows:)

THE COURT: Do you know how much longer you're going to be? I've got this jury coming back.

MR. BAKKEDAHL: We've probably got an hour.

THE COURT: Okay. Do you know how long you

all's Cross-Examination is going to last?

MS. VROD: Between ten and 20 minutes, I would say.

THE COURT: What is it you all suggest I tell this jury?

Ms. Vrod?

MS. VROD: Well, my suggestion would be if -- how much longer is the Powerpoint?

MR. BAKKEDAHL: Well, I'm done when the Powerpoint is over. It's probably about an hour. I mean, this is --

MS. VROD: The Powerpoint continues through the testimony?

MR. BAKKEDAHL: Yeah.

MS. VROD: Perhaps the Powerpoint, if it doesn't need any accompanying testimony, the Powerpoint could be presented to the Court and the remaining testimony could being taken telephonically after we've dealt with the jury.

THE COURT: We can't do that, Ms. Vrod. I have this jury waiting on us.

MS. VROD: No, I understand that. But I'm saying after we've dealt with the jury, not now.

THE COURT: What do you mean after we've dealt with them?

MS. VROD: Well, if we go through the voir dire, if we started to -- perhaps the remainder could be taken at 5:00.

MR. BAKKEDAHL: I mean, look, it's unfortunate --

THE COURT: I'm not going -- I'm not -- I am not going to get in the position where this jury is not sworn and I let people go and you all start exercising peremptory challenges.

MS. VROD: No, I understand.

THE COURT: So we're going one way or another, I just want to know how much more time this is going to take.

MR. BAKKEDAHL: Well, I mean, isn't it --

THE COURT: This is the Defense's fault, not the State.

MR. BAKKEDAHL: But isn't it worth the inconvenience to the jury for an hour and 20 minutes to avoid any problem down the road? I mean, it makes sense. Let's just get it done. I mean, I'm -- you know, I'm moving him up a little bit, but at the same time, I'm trying to lay a good record. We're getting into the most important aspect of the issue as we speak and, you know --

THE COURT: All right. But -- I understand,

but you haven't been here all week and we have.

MR. BAKKEDAHL: But I've been in your shoes. I understand what the concern is.

THE COURT: All right. Okay. This should have been done a long time ago.

All right. Present what you want to present, Mr. Bakkedahl, but get to the point with it. I -- I got it. I know you want a record. I know this isn't your fault, however -- I know this isn't the State's fault, this is the Defense's fault, but I've got 47 people that the more they stew down there, the worse it's going to get for us as far as selection and getting a fair and impartial jury that's going to hear this case. Yeah, it's easy for you all to say just make them come back at five o'clock. Well, it's not as easy to say as -- easy to do as you all say it is.

MR. BAKKEDAHL: You really think you're getting a jury out of 47 people in a capital case?

THE COURT: Well, had I not had this problem, I would have known by now.

MR. BAKKEDAHL: Well, you would have known by now, but the fact is you're probably coming back Monday anyway, so what's the difference?

THE COURT: No, I'm not. Not on jury

selection. We're going to stay here until midnight if that's what it takes.

MR. BAKKEDAHL: Not if you run out of bodies, you won't.

THE COURT: That's true. Well, what I could do is finish the voir dire and finish this after we get done with jury selection. You want to do that?

MR. BAKKEDAHL: No, I don't want to do that.

THE COURT: Okay.

MR. BAKKEDAHL: I'm just saying -- I mean, I understand your frustration, but this -- it's -- unfortunately, a trial is a fluid process. They're just not -- it's just the way it goes.

I will try to speed it up as best I can. I don't want to cut the man off, though. That's my concern. And if you give me just a second, I'll talk to him and we'll pick it up little bit.

THE COURT: Okay. I'm going to tell them --

MR. BAKKEDAHL: You don't have to leave.

THE COURT: I'm not leaving.

I'm going to tell the bailiff to go down and tell the jury to be patient.

MR. BAKKEDAHL: Okay.

THE COURT: Okay. Have a seat.

(Conference at bench concluded.)

THE COURT: Would you mind walking down and telling the jury to be patient with us? We're getting to them as quickly as we can. Or somebody.

THE BAILIFF: Do you want them to take a smoke break or do something?

THE COURT: If they want to take a smoke break, sure. Relax. We'll get with them as soon as possible.

Okay. Let's press ahead, please.

BY MR. BAKKEDAHL:

Q. Okay. So we've moved into the identification standard. And the significance of this, these two standards is what? I mean, this is basically -- are you all right?

A. Yeah, just -- oh, sorry.

Q. Okay. And the importance of the identification standard I and II is what?

A. Is basically what firearm and toolmark examiners use to make their -- their conclusions. Okay? So the theory of identification as it pertains to the comparison of toolmark enables opinions of common origin to be made when unique -- when unique surface contours of two toolmarks are in sufficient agreement.

Agreement is significant when it exceeds the best agreement demonstrated between toolmarks, or in our case,

striations, known to have been produced by different tools, and in our case, guns, and is consistent with the agreement demonstrated by toolmarks, or striations, known to have been produced by the same tool, or if you would, in our case, guns.

Q. So when we talked about the scientific method earlier on, this is going to be our theory?

A. Correct. This is standard, our theory of identification. Okay?

And just to break it down really quickly, the agreement is significant when it exceeds the best agreement demonstrated between toolmarks known to have been produced by different tools and is consistent with the agreement demonstrated by toolmarks known to have been produced by the same tool.

In other words, whenever agreement is concluded, it's because these marks are in agreement, and these marks are in agreement incident to that very random manufacturing process that goes on.

And so by no means is this a low threshold when considering all that uniqueness that is imparted incident to manufacture.

Now, during training, a firearm and toolmark examiner will gain appreciation for known matches and what known matches look like to each other. When I went for

training, for example, I looked at hundreds of known matches to each other to gain an appreciation for what an identification looked like. Also, during my training, I looked at known non-matches, ones that are known to have been produced by different tools.

Q. And, again, this just enables you to develop an eye to be able to recognize this like a Cadillac versus a Yugo?

A. Right, but more in terms of the actual --

Q. Details, individual characteristics?

A. Individual characteristics.

Q. Right. I want to stop you there again because it's important. Those -- those two theories are also subject of attack, if you will, by the enemies of this particular science on the grounds that it's purely subjective; correct?

A. Right.

Q. Can you explain to the Court how that's not the case?

A. Well, first of all, it isn't purely subjective an opinion as you see here on this slide. A subjective determination must be made by a qualified examiner as to the amount of agreement necessary for an identification.

However, that determination is based on objective examination of these toolmarks. Okay? And just because

there's a subjective determination, that doesn't render it any less scientific.

Q. Okay.

A. There's subjectivity in many sciences. We see subjectivity in the case of, say, a chemist trying to find a baseline on a particular instrument or a doctor diagnosing a head cold or a dentist who evaluates -- or a dentist or radiologist who evaluates an x-ray for some sort of damage, or a cavity, in the case of a dentist.

Q. Or, for instance, when we talk about in the legal proceeding, an objection might be made by somebody, a party, to relevancy and the Court has to make a ruling based on a rule of law of relevance. The Court may subsequently be reversed on that ruling by a subsequent Court, but the Court arrives at its ruling based on a subjective analysis of the fact, but objectively viewing it under the rules of evidence; correct?

A. Yeah --

Q. Doesn't mean the rule is invalid?

A. -- that similarity can be drawn.

So subjective determinations are made based on, say, the training and experience of the Judge or any other entities.

Q. Okay. So does the subjective aspect of the examiner's review of the evidence affect or otherwise

minimize the validity of their underlying objective criteria or standards or methodology?

A. It does not, no.

Q. Okay.

A. So --

Q. And it --

A. So the standard has a subjective component based on an objective examination. Firearm and toolmark examiners will use the same type of equipment and follow the same procedures to come up with their conclusions and -- and if they do that, several or different firearm and toolmark examiners will reach the same conclusions if they follow the same protocols and use the same equipment.

And a subjective examination, and I kind of hinted at this in our conversation a little while ago, the results of a subjective examination are based on an individual's opinion, but this does not mean that this type of examination is unreliable or unscientific. There is subjectivity in every science and in every test. And there's some examples there that I already mentioned.

So what makes an identification possible? First of all, proposition number 2. And just to recall what that is, tools are individual as a result of manufacture. Secondly, a sound examination method by employing the precepts of empirical research or study in the comparison

of two toolmarks, a sound examination protocol is followed. Also, training to develop the cognitive skills to view patterns. An examiner undergoes standardized technical training that develops cognitive skills to recognize, differentiate and understand the pattern of marks and their uniqueness.

Besides that, firearm and toolmark sections of the laboratory work within the framework of the quality assurance system. And we talked a little bit about accreditation earlier. Accreditation actually views the quality assurance system of a laboratory.

So, basically, a quality assurance system sets forth essential elements of sound technical procedures. They also provide competency testing for people who are done with training and going into actually receiving casework. They also provide proficiency testing along the career of that particular examiner. They require specific examination documentation like verification by another trained examiner that would be noted somewhere in the case files and also a description of the locations of the identification. A technical and administrative review of a case file will further ensure that examination results are reliable. Audits are performed by entities such as ASCLD/LAB, and both the Indian River Crime Laboratory and the Miami-Dade Police Department Crime Laboratory are

accredited by this entity.

So what are the significance of these conclusions? Based on proposition 1, examiners will rarely, if ever, make a misidentification, and proposition 2, tools are individual as a result of manufacture, an individual association or identification conclusion can be effected. These individual associations result from the practical certainty of the validated theory and not from an absolute certainty.

You can't say a particular casing was fired from a particular gun to the exclusion of all others. You cannot say that. But you can say that based on a reasonable degree of scientific certainty that it is.

There is no way to be absolutely certain of any identification without comparing a particular set of marks to marks created by every firearm produced since the invention of the modern day firearm. Such an endeavor is completely impossible. So --

Q. Okay. Let me stop you there. I don't mean to get outside your area, but, you know, one of the things in the report, in the NAS report, it kept talking about DNA as the gold standard, DNA is the gold standard. And my understanding is even in the area of DNA, the experts do not come in and say, it is the person to the exclusion of everyone else in the world, but they say to a reasonable

degree of scientific certainty, or something to that effect; correct?

A. Correct. They will give a probability. Or if the probability is very high, they'll give an indication, but there won't ever be ever absolute certainty. No science will have absolute certainty.

Q. Okay. So then, again, moving, then, forward, when we talk about the allegations levied by the enemies of the science, they -- one of -- another one of their complaints relates to quantifiably or basically putting a number on it or somehow trying to statistically establish the likelihood of a match, more in line with the DNA statistics and so forth; correct?

A. Right.

Q. Okay. And that -- go ahead and let's talk about that as --

A. Right. That cannot be done in firearm and toolmark examination because there's not those set variables that's seen in, say, DNA. You can't ascribe that same type of equation, if you will, to a toolmark.

However, you can ascribe this practical certainty in -- in very rudimentary statistical terms, and that's what I'm doing in these next couple of slides.

So how individual are these striae that we talked about. All right? So let's use a simplified approach to

obtain an idea of the probabilities of land impressions on bullets from different weapons. Now, this is taken from a textbook on the subject of firearm and toolmark examination written by a gentleman by the name Brian Heard.

In his textbook, he draws an analogy of randomly filling in a number of boxes so that the analogy can then be translated into matching striations and land impressions, and there will be three conditions. All right?

The -- first of all, there are 20 boxes, ten of which will be randomly filled. Secondly, each of the filled boxes can be heavily shaded or lightly shaded. And thirdly, each of the filled boxes can either have an X or a Y. And I'll bring this all back into -- into striations on bullets at the end of the series of slides, but this is just drawing a very conservative view to some of the striae individuality.

Okay. That said, in your mind's eye, imagine that I pass out a page with 20 empty boxes to you and maybe a page of 20 empty boxes to somebody else in the courtroom and I asked them to randomly fill in ten of those boxes. What's the probability that when you hand me back your paper that you will have the same exact 20 boxes shaded in; all right? And that's given by this equation here. Now, this equation, you don't need a degree in statistics to --

to know how to use it. This equation is first proposed as -- in Algebra II in high school. All right? All it has is a couple of variables and it has a mathematical convention called the factorial. Not anything that you would need a statistical degree to really talk about. So, basically, C stands for the probability of would two people or two randomly matches for that, or for that occurrence to happen a second time randomly. And in my scenario, I have 20 boxes, which is equal to the M, N is the number of filled boxes I asked the two individuals to fill in ten randomly, and the factorial with an exclamation point means that number times one lower than it and times one lower than it, so on and so forth.

So using that equation, the chance of two individuals, if I gave them 20 empty boxes apiece and asked them to fill in ten randomly, the chance of them having the same 20 boxes filled in in the same location is one in 184,756. All right? I mean, that's what that would look like. Two -- two of the same set of boxes with the same exact ten boxes filled in.

Now, let's take this a step even further. I ask the same two individuals, I give them both empty 20 boxes, please fill in the -- please shade in ten, but shade in ten lightly shaded and shade in -- I mean, shade in some lightly shaded and shade in some darkly shaded. What's the

probability that you two, or the two individuals that I gave the 20 boxes to, will have the same exact lightly and darkly shaded boxes in the same position? So you take the probability that you established already with proposition or condition 1 and you will multiply it by two to the tenth power. Why? Because ten -- ten boxes at the tenth power, and then there's two possibilities in those boxes; there's lightly shaded or darkly shaded, two to the tenth power, which is equal to 1,024. So we already established that the location of the boxes was one in 184,756, multiply that by 1,024, and you have a chance in one in 189,190,144 that two individuals will have the exact same lightly and darkly shaded boxes. That's what that would look like.

So now let's add condition number 3. I ask the same two individuals, lightly and darkly shaded, to do ten boxes and add an X or a Y in there, in those lightly and darkly shaded boxes. Again, there's two types or two different things that could happen in those boxes, either an X or Y. So, again, two to the tenth power. You take the probability from condition 2, which was 189,190,144, multiple it by two to the tenth power, which is 1,024, and you have a chance in 193,730,707,456 that those -- that two individuals will randomly pick the exact same boxes, have the same amount -- same shading in those boxes and have an X or Y.

Now let's bring this simplified statistical example into the context of a bullet. We have a single land impression on a bullet which we divide into 20 longitudinal sections, and in ten of those longitudinal sections are randomly placed ten striations. The chance of two land impressions on bullets from different weapons accidentally matching based on that first condition is one in 184,756. Now, if each of these striations can have one of two profiles, a pointed shape or a square shape, then the chance of two land impressions from different weapons accidentally matching under these criteria turns into one in 189,190,144. And if you add the third convention where striations can be one of two widths, either thick or thin, you have a chance in one in 193,730,707,456 of those striations occurring randomly in a second gun. Okay?

And then this is an example of striae markings from one land impression, and then I juxtapose that next to the boxes that we were using as an example. And there's the close up of that. So this is a conservative example.

In reality, there will not just be 20 possible positions for striations in the land impression, but there will be tens to hundreds of positions for striations. There will not just be ten striations, but once again, tens to hundreds, the number only being limited by the resolving power of microscope. There will not just be two profiles,

there will be tens of possibilities. And there won't just be two types of widths, thick or thin, there will be many levels in between that. So there would be also tens of possibilities there. And so in reality, our example would actually only be a small section of that land impression. So just taking the one land impression alone, the number becomes incredibly vast. If this is extended to the possibility of finding two bullets where all the land impressions match, now, again, bullets will not just have one land impression, they could have five land impressions, they could have six land impressions, eight land impressions. If this is extended to the possibility of finding two bullets where all the land impressions match, then the number must be infinitely large and reach a state where it is a practical impossibility that two bullets from different weapons will have the same pattern of striations. So practical impossibility I think in these last couple of slides is demonstrated well.

Q. And not to put you on the spot for your math acumen, but assume, as in this case, we have a bullet which Mr. Chapman has identified as having been fired from the weapon, but we also have a shell casing which has been identified as having fired from this weapon, would that math -- would that increase that number even more so?

A. Yes, it eventually could, although you would have

to somehow apply those mathematics to the casings as well.

Q. Okay. So the --

A. But for more -- once you add more toolmark impressions, that number becomes increasingly bigger and going towards that practical impossibility.

Q. Right. These numbers that we were talking about are, quite frankly, ridiculous. They're numbers that don't even exist in the real world, you're starting to talk about?

A. Right. For example, there's not that many guns in the world. There's not 193,000,000,000 guns in the world.

Q. Yet, but despite that, the standard opinion rendered by an examiner in the field is this opinion, practical impossibility?

A. Yeah, the practical impossibility that two bullets from different weapons will have the same pattern of striations. Also, a reasonable degree of scientific certainty. This is the reasonable degree.

Q. Right.

A. It's -- the probabilities are very high.

Q. Okay. Let's move in, then, to the admissibility and conclude.

A. Okay. So last, but not least, the last sort of thrust of my presentation where I'll talk about the testability of the science of firearm and toolmark

identification, talk about the general acceptance of the firearm and toolmark identification, peer review, known or potential error rates that are known -- that are out there and maintenance of standards and controls.

Q. And basically what you're doing here is applying the Daubert Frye test to the field --

A. Correct.

Q. -- to the science?

A. Yes. And going by each of those prongs and -- and showing that firearm and toolmark identification does fulfill them.

So the first definition, testability is a critical evaluation process that supports or refutes a hypothesis. What evidence exists to support the science of firearm and toolmark identification? There are numerous empirical and validation studies of consecutively manufactured tools that have been published over the past 50-plus years.

Why consecutively manufactured tools, you might ask. Why is the focus on them? Because that is the situation where if there was subclass carryover or if there was a potential for individual markings to be the same, those would be in those situations where a tool -- a work piece, let's say a slide that has a breechface mark, is made consecutively next to another one with the same tooling, the same variables, are the same. All the same

tooling is there, and then the markings will be made consecutively on different items. So an evaluation of consecutively made pieces of a firearm is important because it evaluates -- it looks at the scenario where there is a most potential for some sort of a carryover.

Q. And I'll stop you there just to ask you, in the history of the science, has there ever been a case where two known firearms, if you will, have produced identical -- two known independent firearms have produced identical bullet casings, what have you? Has that ever happened?

A. It has not happened.

Q. Okay. Now, as it relates to this issue, where we talked about publications, this is actually the area in which you assisted in a publication; correct?

A. That is correct.

Q. Okay. Just very briefly describe for the Court how you all performed that.

A. Okay. We applied for a federal grant. We received the money to perform our evaluation of consecutively made Ruger breechfaces. Okay? Basically, we contacted the manufacturer, had them produce ten consecutively made slides and confirmed through a letter that the final broaching operations of that breechface was done in a consecutive manner. And also gave us other manufacturing information about that.

We received those slides in our laboratory and then we made tests, lots of tests. The idea of our research project was to send test materials to every firearm and toolmark examiner that -- that is currently working in the United States. And we used the AFTE membership to -- to ask them to volunteer to take this.

In the end, I'll fast forward a little bit, after we sent out our tests, and the tests were basically made up of 15 unknown casings, and then ten sets of known casings, one from each of the slides, okay, and the examiner was asked to evaluate the knowns to the -- to the unknowns and then fill out an answer sheet and then send that back in. It was blind in the fact that they had no idea, or no one in that particular laboratory had any idea what the correct answer is.

After a period where we sent these out and examiners performed this test, we then took the answer sheets and then compiled them. In the end, we had 217 participants and we generated an error rate from that, and I'll cover that in a later slide. But that was the gist of my validation study or a validation study that I was a co-author on and how that was performed. And --

Q. And it proved what?

A. And it showed that even when slides are made consecutively, trained firearm and toolmark examiners can

identify these casings back to a particular slide. The reason why we concluded that is because we had a very low error rate.

Q. And this consecutive manufacturing study is not the only one that's ever been conducted; correct?

A. Right. I have a listing of several of them.

Q. Go ahead and just rattle them off.

A. Okay. So we'll talk about these studies, or at least mention them. So there have been several consecutive manufacturing studies, and one type was with cut rifling in gun barrels. Lutz with their cut rifling consecutively made barrels in 1970, Skolrood in '75, Brown & Bryant in '95, Brundage in '98, Miller in 2000, Hamby in 2009.

There was also consecutive manufacture studies for forged rifling or rifling that has been, instead of a gang broach, that has been used to impart rifling, a button process, perhaps, where a button is put through the barrel, a barrel that is slightly smaller than the button and then the rifling is imparted in that way. Murdock looked at consecutively made button rifles in '81, Hall in '83, Matty in '85.

And then DeFrance looked at electrochemical rifling in 2003. Electrochemical rifling is used by a few manufacturers, Smith & Wesson being one of them to impart rifling. Buttoning, button rifling and cut rifling are

more typical.

Also, those were just on barrels. In other words, on -- on the evaluation of bullets that are fired through these consecutively manufactured barrels. There have also been several studies looking at other firearms' components, i.e., Matty looked at Raven breechfaces in '84, Bunch & Murphy looked at Glock breechfaces in 2003, Coffman looked at Remington bolt faces in 2003, Lyons looked at Caspian extractors in 2009, Fadul looked at Glock EBIS barrels, which is a particular type of barrel used for only law enforcement in 2011, and then Stoiloff, Fadul, Hernandez and Gulati looked at Ruger breechfaces in 2011. Hernandez, that's -- that's me.

There also have been consecutive manufacture studies on tools, all right? Chisels were done by Flynn in '57, screwdrivers by Burd & Gilmore in '68, Butcher & Pugh bolt -- looked at bolt cutters in '75, Reitz looked at drill bits in 1975, Watson looked at knives in '78, Cassidy looked at pliers in '80, Tuira looked at knives in '82, Van Dijk looked at steel stamps in '85, Eckerman looked at chisels in 2002, Thompson & Wyant looked at knives in 2003 and Clow looked at actually the same set of knives that Thompson & Wyant evaluated in 2005.

And basically, all of these consecutive manufacture studies, it was -- these tests were made with

known and unknowns and examiners would perform these tests and it was seen that even though these items were consecutively manufactured, they were still making identifiable marks to -- to the particular tool. And because --

Q. And that's because the concern is that a consecutively manufactured tool is the most likely tool to create similar points of identification?

A. That is correct.

Q. Okay.

A. And --

Q. And you --

A. -- even in this consecutive scenario, they -- it was found that there was very lower error rates and -- and showing that examiners can, indeed, make identifications to consecutively manufactured items.

Q. Okay.

A. Now, these studies were specific to parts of the firearm. So, they would only be strictly for the breechface or strictly for the extractor, strictly for the firing pin or strictly for the barrel. All right? And then same thing with these tools.

So, a summary of the empirical research. These studies have been found to support proposition 2. And I'll summarize proposition 2, that incident to manufacture,

different working surfaces will have an identifiable mark, and that is because of chip formation and the slow wear of the tool that's making that impression in that interaction of that tool with those chips in -- in a rapid motion.

There is general acceptance in firearm and toolmark identification. All right? What is general acceptance? It's approval by a particular authoritative body of a technique or methodology. In addition to the forensic science community, numerous colleges and universities have courses in firearm and toolmark identification. Funding of scientific research in the area of firearm and toolmark identification has been granted to researchers outside the firearm and toolmark community, in the fields of academia, for example, and firearm and toolmark identification has been accepted in court testimony for almost 90 years.

Here's a listing of schools that have a component of firearm and toolmark criteria.

Here are grant programs that issue monies for research in the field of firearm and toolmark identification, within the science of firearm and toolmark identification. There's the National Institute of Justice, AGIS in Brussels, the Canadian Police Research Centre.

The earliest firearm and toolmark cases where there was side-by-side microscopic comparison. There's the

Stielow case in 1917, the Sacco-Vanzetti case in 1921, State v. Clark case in 1930 related to toolmarks and showing that this science has been used in court for the past 90 years.

And our science is also peer reviewed and there's a publication process. There is an evaluation of -- well, the definition of peer review and publications is the evaluation of a colleague's research. And there are selected peer reviewed journals where research of firearm and toolmark examinations are published. One of these journals is the Association of Firearm & Toolmark Examiners, AFTE Journal, it's been around since 1969. It's a quarterly journal that -- that publishes research and papers and -- and validation studies in the field. There's the American Academy of Forensic Sciences, and they've published the Journal of Forensics Sciences since 19 -- since circa 1942. There's also the International Association For Identification. They publish the Journal of Forensic Identification. It's been around since 1988.

Q. Let's just --

A. Each of these peer reviewed articles -- go ahead.

Q. We've got articles marked for identification. Are some of these articles that have been published in these journals and have been peer reviewed?

A. Correct, they are.

Q. All right. Go ahead.

A. Okay. Now, let's move into error rates. Error rate is the frequency at which one deviates from a correct standard. Errors can occur from a number of sources and may result in a false positive error or a false negative error. Another name for a false positive is false inclusion and another name for a false negative is a false exclusion.

These are the error rates or listing of error rates from some of these validation studies. Brundage in '98 reported no errors from his validation study. Hamby & Thorpe in 2001 also reported no errors. Bunch & Murphy in 2003 also reported no errors. Thompson & Wyant under knife study reported a 0.78 percent error. Smith in 2005 reported no errors. Orench in 2005 reported no errors. Hamby, Brundage & Thorpe reported an error rate of 0.0712 percent. Lyons in 2009 reported 1.2 percent error rate on extractors. And Fadul in 2011 reported a 0.4 percent error rate on his EBIS barrel study. Stoiloff, Fadul, Hernandez, that's me, and Gulati reported a 0.0636 percent error on their breechface study on the pistols.

Q. Were those error rates broken down to differentiate between false positive and false negative?

A. No, these were misidentification. That's what these error rates show.

Q. Okay.

A. At least -- I know that for a fact in my case.

Q. Okay.

A. I really don't know for a fact in every other case.

Q. Okay.

A. But I know it's a general convention that misidentifications would be an error. But also a false exclusion could be, too.

Q. Right.

A. I don't know what the others did.

So, I talked about the validation studies. These validation studies have been taken by trained firearm and toolmark examiners.

There's also an entity called Collaborative Testing Service, CTS. All right? They're a company that makes proficiency tests and sells them to, say, a crime laboratory so that they can give a proficiency test to an examiner and then that examiner performs his test. They give the results into the quality system and that result is then given to CTS and then they will evaluate for correct responses.

CTS will sell their test to anyone. They'll sell them to crime laboratories, they'll sell them to lawyers, they'll sell them to academia, and different entities will

use these for different reasons. All right?

So, what I'm trying to show is that these errors are -- are slightly skewed higher as a result of -- of non-trained examiners only using them.

And I would also like to mention that CTS, or the Collaborative Testing Services has issued a memorandum, if you will, explaining that their error rates cannot be used to -- to evaluate the error rate of any one particular field. They use error rates for -- I mean -- I mean, they make tests for trace, they make tests for DNA, they make tests for firearm and toolmark identification. But these error rates are from our particular field and anyone could have taken them, and CTS has also said you can't use them.

Q. So why did you put it in here?

A. I just put it in here to show that -- like some detractors, if you will, of the field have mentioned these. But anyone can take these, just so you know, and so there's a skewed error that's higher.

Q. So why --

A. Whereas, studies are near one percent or less than one percent or no errors reported at all. These are skewed --

Q. If I ordered a kit from CTS, took the test, send in the results, you bombed it on every level, that would be included in error rates?

A. That would -- that is correct.

Q. Okay. But I think I can get the class characteristics done, so I don't have to worry about it.

All right, go ahead.

A. Besides, the presentation teaches that.

So in summary, firearm and toolmark identification meets the reliability standard put forth by the Frye standard because it is generally accepted, it is testable, it is peer reviewed, has known error rates and it does maintain standards and controls. Oh, I skipped my standards and controls. I'm sorry.

The standards and controls is the establishment and maintenance of operational guidelines and protocols for conducting analytical testing and monitoring quality assurance and controls.

We've touched upon this with the ASCLD/LAB, but these are representative documents that serve as the standards and controls for the science of firearm and toolmark examination. There is agency technical protocols, so Indian River and Miami-Dade will have SOPs that will dictate the protocols that an examiner will undergo when doing an examination and he'll follow those. There's a scientific working group for firearm and toolmark identification called SWGGUN. There's also several AFTE guidelines and standards that are out there. One is a

Technical Procedures Manual, Theory of Identification, Glossary and the AFTE Training Manual, there's an ASCLD/LAB Criteria Manual and also the ISO 17025 standard that is used in ASCLD/LAB International for conformance of the protocols that's used by laboratories.

Q. Okay. And this is just, again, a summary --

A. A regurgitation of the NAS report bringing it back full circle. At no time does this report say that the science is invalid. It gives recommendations to perform more research, for laboratories to pursue accreditation and for individual examiners to seek certification. And --

Q. And, again, just for the record, there is no question that the science that is firearm and toolmark examination is generally accepted within the firearm and toolmark examination community?

A. Right, there is no question.

MR. BAKKEDAHL: Finally, Judge, just for the record, I would offer into evidence State's Exhibit 1, which is comprised of the majority of the studies of -- that the witness referred to. It's a composite of 52 individual validation studies conducted in the area of firearm and toolmark examinations. Again, this is for the record.

And then a compilation in State's Exhibit 2 of

128 articles plus 11 books written in the area of firearm and toolmarks examination, basically comprising the history of --

THE COURT: Does the Defense have any objection to those being admitted for purposes of this hearing?

MS. VROD: Judge, I'm sorry, I will object, though. And I would just like to note for the record that we've received absolutely no copies of what is intended to be introduced into evidence by the State.

And also, if we are going to conduct this according to the evidentiary rules that the State is suggesting, that these scientific articles would not be admissible. They would only be usable on Cross-Examination of an expert and would not be admissible to bolster his opinion on Direct Examination. So I think what's good for the goose is good for the gander.

MR. BAKKEDAHL: I think --

THE COURT: Ms. Vrod -- okay, Mr. Bakkedahl, real quickly and I'll make a decision.

MR. BAKKEDAHL: I think the witness has indicated that he relied upon these articles, periodicals, books, summaries and so forth in

formulating his opinions. They support the science and they would be admissible for purposes of the Frye hearing.

THE COURT: All right, I'll overrule the objection. We'll make them a part of the record admissible for purposes of this Frye hearing on the issue. That doesn't mean they're admissible at the trial.

Mr. Bakkedahl, any other questions?

MR. BAKKEDAHL: No, sir, no further questions.

THE COURT: Ms. Vrod, any Cross-Examination, please?

Recognize, please, we have the jurors waiting for us.

MS. VROD: I didn't hear you. I'm sorry, Judge?

THE COURT: I said recognize that we have the jurors on us.

MS. VROD: I do recognize that, Judge.

THE COURT: Go ahead, ma'am.

CROSS-EXAMINATION

BY MS. VROD:

Q. Okay. Mr. Hernandez, first of all, you graduated with a masters in forensic science in 2004; is that correct?

A. That is correct, Masters of Science in forensic science in 2004.

Q. And that was from John Jay; is that correct?

A. That is correct.

Q. Okay. And you also taught there from, what was it, 2002 to 2005 as an adjunct professor?

A. That is correct.

Q. And in the course of time that you were either a student or an adjunct professor at that school, or actually they overlap, are you familiar with Adina Schwartz?

A. I did not know her at the time that I was in school, but later on I read some of her affidavits.

Q. Okay. And who is Adina Schwartz?

A. Again, I don't know exactly, but she apparently works at John Jay, but not in the science department where -- where I was a student.

Q. Okay. And she works at John Jay in that she's a professor there, a full professor; is that correct?

A. She's a professor, but not in the science department.

Q. Okay. Do you know what department she's in from your reading any of her affidavits?

A. Something that I'm -- honestly, I really don't know, but I know it -- it's one of the, maybe, criminal justice departments, but that's just a guess.

Q. Okay. The affidavits of her that you've read have been accepted in court; is that correct? Given her expertise in a certain area; is that correct?

A. It depends on what you mean by "expertise."

Q. Well, that's what I'm asking you.

Which affidavits of hers have you read?

A. I don't know the names off the top of my head.

Q. Okay. And you haven't brought them with you?

A. I don't have them here, no.

Q. And when -- these affidavits, from your recollection, they purported to be affidavits of an expert in what expertise?

A. If I remember correctly, Adina Schwartz mentions that she is an expert in the -- in the review of literature in firearm and toolmark identification. However, she is not a firearm and toolmark examiner.

Q. Okay. Applicable of that, you said that you've testified ten times previously; is that correct?

A. That is correct.

Q. And that's all been in Miami-Dade State Court; is that correct?

A. That is correct. Oh, and once in federal court.

Q. And the time that you were in federal court and the nine times in State Court; am I correct?

A. That is correct.

Q. Were they -- were you employed by the Miami-Dade Police Department?

A. Yes.

Q. And all of those ten times, you were testifying as an expert for the State?

A. In those ten times, yes.

Q. And did you ever testify at any hearing that was denominated as either a Frye hearing or a Daubert hearing?

A. No.

Q. So you've never been called upon to testify as an expert in the science per se; correct?

A. Well, as a -- I'm not sure how to answer that. As a -- as a firearm and toolmark examiner, when -- when I'm called as an expert witness, it's because of the science that -- that I have, and I'll describe that to the Court, to the jury and I'll hit upon many elements of today's presentation upon the talk of whatever analysis was -- was done and whatever conclusions were rendered.

Q. Okay.

A. But as far as the Frye hearing, this is my first Frye hearing.

Q. Now, as far as the Powerpoint that you presented to the Court today, was that prepared for court today or have you presented that previously?

A. I -- I prepared that for this Frye hearing. And

for -- and it could -- has many applications. I mean, I could use that for teaching and for any trainees that come to our laboratory now, but it did not exist prior to this court hearing.

Q. Okay. And was it ever peer reviewed?

A. It was peer reviewed by fellow firearm and toolmark examiners that work in my laboratory.

Q. Okay.

A. Oh, and also the Indian River Crime Laboratory.

Q. So you came up --

A. And -- I'm sorry.

Q. No, no, no, finish your statement.

A. Yes. I just wanted to point out that this presentation is available on the SWGGUN site. Now, you could add to that presentation, and I have, but I didn't really take anything away from it.

So by it being peer reviewed, there's definitely a majority of my presentation that has been peer reviewed by hundreds of firearm and toolmark examiners that have viewed the SWGGUN site and opened up this presentation.

Q. Well, let me ask you this: What is a peer reviewed article in the Journal?

A. It means that it is a review of work by a colleague.

Q. Okay. And that's prepublication; is that correct?

A. It could be prepublication, but it could also be post publication.

Q. Okay.

A. Whereas --

Q. Wait, wait, wait, wait.

A. Okay.

Q. You're not meaning to suggest that by your uploading this Powerpoint into the SWGGUN site that, that it's by any means peer reviewed in a sense that you said that something is a peer reviewed article in a journal, are you?

A. My particular Powerpoint or the Powerpoint that already existed?

MR. BAKKEDAHL: Judge, I'm going to object --

BY MS. VROD:

Q. No, I mean --

MR. BAKKEDAHL: Excuse me. I'm going to object because she asked him was it peer reviewed. He didn't offer that. I mean, she asked him. He's simply saying in a technical sense, yes.

THE COURT: What's your objection? Tell me your objection.

MR. BAKKEDAHL: Her -- the objection is that the questions are misleading and irrelevant.

THE COURT: I'll overrule the objection.

Go ahead and finish your answer, please.

Now, let me just tell you all something. If this isn't going to get done timely, then we're going to finish the selection and then we're going to finish this afterwards.

Okay. Go ahead.

THE WITNESS: Could you please repeat the question?

BY MS. VROD:

Q. Okay. Let me break it down into parts.

A. Sure.

Q. Okay. When you were -- when we in -- when forensic scientists, or any sort of scientists, speak or any sorts of experts in any field speak about a peer reviewed article in a journal, that's an article that is submitted to peer review and then the peer review is taken into consideration for editing, changes, amendments in the article prior to it being published as a peer reviewed article; is that fair to say?

A. Right, that is fair to say.

Q. Okay.

A. But --

Q. Now --

A. -- peer review doesn't just end there. Peer review is a --

Q. It's a continuing --

A. -- an evolving thing, as any good science will have. And after it's published, if there's any scientist -- that now it's opened up to a broader audience, there could be findings that could make that study better or -- or refute certain things. And so peer review is a continuous, evolving thing.

But what you're saying, right, prior to publication, there is a peer review.

Q. Okay. Now, let's talk about -- I believe that you talked about, and correct me if I'm wrong, you got a single grant or two grants?

A. Two. But --

Q. And what --

A. -- let me go back to the peer review of the slides. The slides were downloaded from the SWGGUN site, but SWGGUN is made up of several firearm and toolmark examiners. I believe it's approximately 15 of them. And they -- they made this, and it's -- so the one that exists was peer reviewed prior to me taking it and adding to it.

Q. Okay. So you basically took preexisting Powerpoints, compiled them with your a -- with -- from SWGGUN, compiled them with your additions into the Powerpoint that you showed us today?

A. One Powerpoint, the one from SWGGUN, and then I

made some additions.

Q. Okay. Fair enough.

Now, as far as the two grants that you were given, one had to do with the study, the validation study that you were talking about; right?

A. Correct, the Ruger slides.

Q. Okay. And the second grant was with reference to -- was actually spawned by the -- the publication the NAS report; correct?

A. No. Both of them were -- were the same -- essentially the same grant, solicitation came out and we applied two research papers into this one solicitation and we were awarded two awards. One was for the Ruger study, the second one was to evaluate ten consecutively made Glock barrels.

Q. Okay.

A. And so that's the second one. So both, in effect, were as a result of NAS.

Q. Okay. That's what I'm driving at, okay?

So when we're talking about, and you heard the State has no objection to us putting in the NAS report on strengthening forensic science, the path forward into the evidence, do you agree that that report is authoritative?

A. Authoritative not in the sense of what they were tasked to do. They were tasked to look at firearm and

toolmark examination -- or not just firearm and toolmark exam. They were tasked to look at all forensic sciences and give a clear path on how to improve forensic science.

Q. Okay.

A. All right? So -- and their charge wasn't really completed at all. They give recommendations, but then they don't give any way to really fix those things.

Q. Okay. But the recommendations gave rise to your getting funding for continuing research to better the field that you're in; is that correct?

A. It's my understanding that because of that report, monies did become available for further research.

Q. Okay. Now, as far as the -- the Association of Firearm & Toolmark Examiners, AFTE, the acronym, you said you're a member there; is that correct?

A. That is correct.

Q. Okay. Now, what is necessary in order to become a member of AFTE?

A. Okay. You have to fill out an application. You need to get a letter of recommendation from three examiners or three members that are currently --

Q. Three current members that are --

A. Three current members that are in good standing, and you have to derive the majority of your salary from being a firearm and toolmark examiner.

Q. Okay.

A. And you could also be a technical advisor if you don't derive your full salary from being -- from firearm and toolmark examination, you could become a technical advisor, as well. There's different avenues to membership.

Q. Okay. And is there any requirement of any sort of college diploma?

A. At this time, I'm -- I'm not a hundred percent sure if that is now part of -- of the criteria, but I know -- I can't say if it is or isn't, but I think it is.

Q. Okay. But you're not sure?

A. I'm not sure.

Q. Okay.

A. During --

Q. When did you become a member of AFTE?

A. I became a member, let's see, I think it was 2006.

Q. And at the time that you applied in 2006, was a high school diploma a requirement, or a college diploma?

A. I'm not sure if a college diploma was a requirement then, or even is now.

Q. Okay. Now, you also said that you were certified by AFTE; is that correct?

A. Correct, in the area of firearm and toolmark examination.

Q. Okay. So that's --

A. Right.

Q. So that's something all members are not certified; is that correct?

A. Correct. It's a voluntary program that you volunteer to take the certification test or sit for the certification test, and then later, upon successful completion of that test, a practical exam.

Q. And the certification test involves you looking at some known exemplars? It's a practical exam; is that correct?

A. Well, first it's a written exam with --

Q. I'm concerned -- if you could -- I understand that it's partially written and partially practical. Can you just --

A. Correct. You first have to pass the written exam and then the practical exam is you're given a set of unknowns and knowns and asked to evaluate them.

Q. And what's the pass rate?

Let me rephrase that. How many do you need to get correct of however of the set of what you're given in order to pass the exam and --

A. You need to get all of them correct.

Q. You need to get every single one correct?

A. Yeah, you have to -- you need to -- you cannot have a misidentification.

Q. Of how many is that?
A. You can't have any misidentification.
Q. No, but how many examples are you given? How many identifications are you asked to look at?
A. I don't remember off the top my head. Anywhere from, I guess, at most ten, maybe five, but I'm not sure.
Q. Okay. Now, you also talked about having a second examiner who would -- it's required in -- when you're in a credited lab, you're required to have a second examiner come and look at what you've done and verify that you've not made any errors; is that correct?
A. A second examiner will verify the work to see that there's a true identification there. It's a verification process and a good practice through laboratory protocol.
Q. And in Miami-Dade, where you currently practice, is that a blind verification?
A. Blind in what sense?
Q. Do you know -- when you are called upon to do a second opinion, do you know what the first opinion was, match or no match?
A. No. You're asked to please evaluate something, and you don't really know why you're sitting down at first and you evaluate it. And then -- then if you agree with what you see on the -- on the comparison microscope, there's an area in the case file for your initials as the

verifier.

Q. So you're given the entire case file to evaluate; is that correct?

A. Not at that point, no. You're given the evidence to evaluate.

Q. Are you given the report of the prior examiner?

A. The report hasn't even been written yet because it's -- the examination is currently happening, so.

Q. Are you aware of the prior examiner's conclusions?

A. No. You -- sometimes you might be, but generally, no. You will sit down and look and evaluate for yourself and then you will look at the finding of the examiner and you'll agree or disagree. But it's usually agree.

Q. Okay. Do you know who William Tobin is?

A. I don't know him personally. I know he wrote an affidavit.

Q. Okay. Prior to your involvement in this case, had you read an affidavit of his or affidavits of his that were introduced in court in any other cases?

A. I read fully this affidavit, and this was really the first time that I -- I knew of William Tobin.

Q. Okay. So you've never read anything prior?

A. I have heard the name and knew that he was a -- a person out there that wrote critically of -- about our field, but I had not read anything of his.

Q. Okay. Okay. As far as -- just give me one minute.

The AFTE concedes, as did you in your Powerpoint, that this -- that there's some element of subjectivity in what you are propounding as a science; correct?

A. Absolutely. Subjective determination is made on -- on an objective examination.

Q. Okay. And the AFTE also has conceded that there are many unarticulated standards and no statistical foundation for estimation of error rates; is that correct?

A. I don't know what you mean by that. Basically, the validation studies serve as the known error rates because, for example, I don't know what you're exactly trying to say. You can't apply --

Q. Do you have a copy --

A. -- the statistics per se to striations. It doesn't work that way. It doesn't -- you have to evaluate markings every gun ever made.

Now, if you mean that way, no, you can't apply statistics in that sense. If you mean the error rates, it's the error rates from these consecutively matching items that -- that are used to talk about the errors in our field.

Q. Okay. I'm really quoting from -- I don't know if you have a copy of the NAS report with you.

A. I do not have one with me, no.

Q. Okay. Well, one of the quotes I wanted to point your attention to is that "the decision of the toolmark examiner remains a subjective decision based on unarticulated standards and no statistical foundation for estimation of error rates."

Do you understand that statement?

A. I heard that statement, but basically, the -- the subjective determination is not unscientific, and I really don't know what the committee members are referring to in the second portion of your quote.

Q. Do you know any of the committee members who have created or were part of the creation of the NAS report?

A. I do not know any of them personally, no.

Q. Okay. Do you know any of them by name such that you would be able to tell us whether they are authoritative in their statements?

A. I know one by name, an individual Dr. Jay Siegel.

Q. Okay. And are his statements -- would his contributions to the report be authoritative?

A. Authoritative in what sense?

Q. Well, is he -- what field is he -- does he purport to be an expert in?

A. I don't -- I know he's a professor. I believe -- now, again, you asked me by name, and so I'll give you the

little information I have on the man. He's a professor that works at a school in Indiana and he was one of the committee members.

Q. And he -- it's listed him as a professor in the forensic and investigative sciences program at Indiana University, Purdue University. Does that refresh your recollection?

A. Yes.

Q. Okay. And would you consider him an expert in his field?

A. I don't know his personal qualifications, so I don't know what exactly that means. I have never read any studies from -- from the individual. I know he was selected for this committee, and that's really all I know.

Q. Okay. Just one last question. The National Academies of Science or Academy of Sciences, do you know -- can you tell us what that is?

A. It's an entity that -- that is charged sometimes by the government to maybe evaluate certain things, but I don't know -- I don't have a prepared definition for you.

Q. Okay. Does it refresh your recollection that it was upon the authority of a charter granted to that organization by the Congress in 1863, the Academy had a mandate requiring it to advise the federal government on scientific and technical matters, and such mandate still

exists? Does that refresh your recollection?

A. Right, that sounds about right.

MS. VROD: Okay. I have nothing further.

MR. BAKKEDAHL: One last question, and I promise it's one question.

THE COURT: We'll see.

REDIRECT EXAMINATION

BY MR. BAKKEDAHL:

Q. The Defense attorney asked you if you previously testified in a Frye hearing, and your answer was?

A. This is my first Frye hearing.

Q. Right, because we don't have these?

THE COURT: That's two questions.

BY MR. BAKKEDAHL:

Q. Is that right?

THE COURT: Three questions.

MR. BAKKEDAHL: All right. Nothing further.

THE COURT: Anything further?

THE WITNESS: My understanding is that they are not common.

MR. BAKKEDAHL: Nothing further, Judge.

THE COURT: Okay. You all are finished with him?

Mr. Bakkedahl, he can step down?

MR. BAKKEDAHL: Yeah.

THE COURT: Miss Vrod, you're finished with Mr. Hernandez?

MS. VROD: Yes.

THE COURT: Thank you, sir, very much for your testimony.

THE WITNESS: Thank you.

MR. BAKKEDAHL: I have no further evidence, Your Honor.

THE COURT: Ms. Vrod, your comments as to Mr. Tobin's documents, whether I should take judicial notice of them or not and/or any comments on the Frye issue?

MS. VROD: Judge, I will -- I think that our motion speaks for itself as far as the Frye issue is concerned and I needn't elaborate further. I know we spoke about it previously at a previous hearing during which we were arguing whether or not a Frye hearing should be conducted in this case.

As far as whether or not you should take judicial notice, I would suggest to Your Honor that I do believe that Your Honor can take judicial notice and it would be the permissive judicial notice variety, not the mandatory judicial notice, and I know that the State was not objecting to a lack of, quote, unquote, timely enough notice and I

think that the affidavit is -- I understand that the State is objecting on hearsay grounds. I do believe that a preliminary hearing, such as a Frye hearing, such as a suppression hearing, that the -- the evidentiary rules are suspended, not necessarily completely suspended, but relaxed such that all the necessary information can reach Your Honor. And I think that in order for the information to reach Your Honor, that's the reason why we were putting in the Tobin affidavit. It has been received by other courts.

As Your Honor knows, we had originally had Mr. Tobin listed in this case along with Miss Carriquiry and Mr. Spiegelman on Monday, the first day that we had been in the jury selection, this past Monday. They -- we received a mysterious e-mail from Mr. Tobin saying that he would no longer be able to testify for us nor would his colleagues, and we have diligently been trying to get somebody to come in and give Your Honor live testimony, however, to no avail.

So because that's the -- there's certainly an issue which was demonstrated by the fact that the State went to such lengths in order to put the record on before Your Honor, and to avoid any

dereliction by Defense in that that's the evidence that we have, we're asking Your Honor to -- however you want to denominate it, take judicial notice of it, look at it, consider it so that Your Honor can reach Your Honor's opinion as to the Frye hearing.

THE COURT: All right. Is it the Defense's position that the documents provided by Mr. Tobin, at least the one that's been presented to me that's unsigned and/or unnotarized, that that constitutes an affidavit?

MS. VROD: It's an unsigned and unnotarized affidavit. I mean, unfortunately, we tried to solicit Mr. Tobin's signature and affirmation or swearing into the affidavit and we were unreplied to.

I would submit as an officer of the court that I believe that it has been submitted in its signed and affirmed to or sworn to versions in other courts of the United States, be it State or Federal, and as such, for -- we are asking Your Honor to take judicial notice and to assign to it whatever weight Your Honor deems is appropriate.

THE COURT: All right. Thank you.

Mr. Bakkedahl, any other comment?

MR. BAKKEDAHL: Yeah. Shouldn't you have a

little concern that the guy won't sign it? I mean, you know, that would give me a real concern for the reliability of the document.

Now, the fact that they can't find somebody to come in here and say what Tobin has said in the past is also strong evidence in the -- in my favor that they -- they don't have a leg to stand on, and it goes back to the general acceptance issue. These -- this witness put on, and I think there was a comment about why I went to such great lengths, why I went to great lengths because I decided to put evidence on, reliable evidence so that Your Honor would understand what the truth is. This matter is generally accepted, but they went beyond that and they established a Daubert standard for you.

So there is just no question about the scientific acceptance and reliability of this evidence. I strongly object to your consideration of -- she says it's just an unsigned affidavit. Well, it is also an unsigned document with words on paper. I mean, so what? It should not be considered. Could you imagine if I tried to offer something like that, what they would say? So, I strenuously object to you considering that.

THE COURT: Okay. All right. Just so the record is clear, we had Mr. Hernandez testify, kind of out of order as a courtesy to him. I know they traveled -- these fellows have traveled a distance, so it was taken a little bit out of order, just so that's clear.

Also, the Defense filed this motion prior to the trial starting, but it was kind of late in the process. And the record will reflect when it was filed. I don't recall exactly.

All right. I've considered the contents of the Defense's motion on this issue, the case law submitted at this particular hearing and some others that I'll make reference to here in just a minute. Specifically, I've been handed Dufour, D-U-F-O-U-R, versus State. It's at 36 Florida Law Weekly S57. It's a February 3rd, 2011 decision out of the Supreme Court.

Also, Ramirez, which is 810 So.2d 836, a 2000 Florida Supreme Court decision.

And also, the other case of Ramirez, 651 So.2d 1164.

I've also considered Professor Ehrhardt's Section -- 2011 Edition of his Florida evidence on this issue. It's Section 202.6. His section also

cites Dufour. It also cites Stoll versus State, S-T-O-L-L, 762 So.2d 870, a Florida 2000 decision, which is also a Supreme Court decision.

I've considered Mr. Hernandez's testimony, both in Direct and Cross-Examination, carefully observed his demeanor as he testified, considered his Powerpoint presentation. I've considered his qualifications, his education, training and experience and given what weight I consider appropriate to that. I'm familiar with the Frye case law, I think, and criteria, and also considered the arguments of counsel.

As to the preliminary issue; that is, whether the Court should take judicial notice of the documents provided by the Defense under their notice, which cites 90.202(6) and/or 90.203 of the Florida Evidence Code, the Defense seeks to have the Court consider those documents and take judicial notice of them and consider them. There was no other evidence other than that presented by the Defense to support their motion. The State objects.

The Court read the affidavit in its entirety overnight as it was just presented to me, I believe it was yesterday afternoon in the midst of voir

dire. I'll make all these documents a part of the record, in the court file for the record.

The Court notes this document is unsigned and has not been authenticated by any witness. It also is not what I consider an affidavit to be, because not only is it unsigned, it also does not have any type of oath or notarization attached to it either, nothing either in the document itself or anything presented by the Defense in court. It has also not been presented which would identify which court file, if any, this document was placed in in any other court proceeding which would furnish this Court with such information to enable it to take judicial notice of the matter.

Second, even if this Court did take judicial notice of this document, it's simply not admissible into evidence for this Court to consider substantive evidence on this issue as it is hearsay in my view. There is no, in my view, no recognized exception to admit this under the evidence code as a hearsay exception, nor has the Defense suggested any, or provided any to this Court.

Let me just for the record, under footnote five in Professor Ehrhardt's Section 202.6 -- before I get to the footnote. Professor Ehrhardt says,

"Judicial notice under 90.202(6) cannot be utilized to justify the admission of hearsay statements in court files." He references footnote five, which cites Dufour, which quotes, "The Supreme Court: While the court may make judicial notice of documents in a court file that were properly placed there, this notice would not make the contents of the documents admissible if they were subject to challenge such as when a document is protected by privilege or constituted hearsay. In addition, taking judicial notice of an entire prior proceeding may be expeditious for the current proceedings, but it does not allow the substance of the underlying materials to be entered into evidence without compliance with the rules of evidence."

It also cites the Stoll decision. "The prosecution erred to admit victim's handwritten statement filed in a prior domestic violence case on the basis that the trial court took judicial notice of that document in the court file. The statement was inadmissible on hearsay."

Professor Erhardt quoted the court on an asserted basis for the admission of hearsay statement with judicial notice: "Although a trial

court may take judicial notice of the court records, it does not follow that this provision permits the wholesale admission of all hearsay statements contained within those court records. We have never held that such otherwise inadmissible documents are automatically admissible just because they were included in the judicial notice of the court file."

They also cite Burgess versus State, 831 So.2d 137, a Supreme Court decision.

And I'm not going to read all of these, but this is the last one. It says, "The trial court cannot consider a hearsay police report in the court file on the issue of whether a sentence was legal." Quoting the court, it says, "In this case, there was no opportunity for the State to rebut or even challenge the accuracy of what was contained in the report."

So, in my view, and, I think humbly in the Supreme Court's view and Professor Erhardt's view, this document simply is just not admissible.

In Dufour, the defendant in that case was sentenced to death by the trial court. This issue came up, of course, in a part of the opinion, and Mr. Dufour's death sentence was affirmed. So I

think the law is quite clear on that in Florida. Therefore, I will sustain the State's objection for those reasons.

Secondly, and just let me finish, even if the Court did take judicial notice of Mr. Tobin's documents, it can't consider the documents as substantive evidence, or this Court's decision sustaining the State's objection. Preliminarily, it's found to be error by reviewing court -- this Court finds based on the sworn testimony presented here in court that has been subjected to Cross-Examination by the Defense and the documents purportedly prepared by Mr. Tobin, that this evidence is sufficiently reliable under the Frye criteria to admit it into evidence. This is assuming the State will establish sufficient predicate at trial, by a competent witness, of course, in the ordinary way, by a witness or witnesses who can testify to it.

Frankly, candidly, I have assigned little, if any, weight to Mr. Tobin's -- assuming it is Mr. Tobin's document, any conflict between the sworn testimony here in court from Mr. Hernandez and Mr. Tobin's document, so I reconcile that in favor of Mr. Hernandez and the State. So this

evidence will be admissible at trial, assuming there's a proper predicate.

MR. BAKKEDAHL: Can I get a ruling on my other objection, which is that -- I think is very important for the Supreme Court, that this is simply, and I think borne out by Mr. Hernandez's testimony, that this is not new or novel science, that --

THE COURT: In my view, as I said, I've accepted Mr. Hernandez's testimony. It's not new or novel in Florida. It's certainly not, for what it's worth, humbly, new or novel to me. I've presided over a number of murder cases and other things where this testimony was accepted, although candidly, it probably wasn't objected to in those other things, but it's not new or novel.

All right. Bring the jury up, please. Thank you all very much. I appreciate it. Bring the panel up, please. If you need to rest, now may be the time. Go off the record.

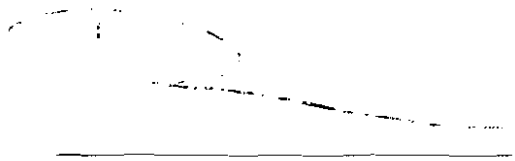
(Thereupon, a break was taken.)

CONTINUED IN VOLUME XV

CERTIFICATE OF REPORTER

I, DEANNE MORRIS, Registered Professional Reporter, in and for the County of Martin, do hereby certify that in the matter of STATE OF FLORIDA and ALWIN CHARLES TUMBLIN, a Frye hearing was held before the Honorable Dan L. Vaughn, Circuit Judge, beginning at the hour of 12:20 P.M. on August 5, 2011; that I was authorized to and did stenographically report the foregoing proceedings in that hearing, and that the foregoing pages, number 1475 through 1609, comprise a true and correct transcript of the proceedings.

Done and dated February 26, 2012, at Stuart, Martin, Florida.



DEANNE MORRIS

Registered Professional Reporter