NOT SUBJECT TO RECALL

That's fine. I thought we would cut -- you're through, both of you? May this witness be excused?

MR. THOMAS: Yes, your Honor.

MR. SANDERS: Yes, your Honor.

THE COURT: Thanks for being with us, Mr. Jones.

THE WITNESS: Thank you, sir.

THE COURT: Call your next witness.

MR. THOMAS: People call Monica Siewertsen.

THE CLERK: You do solemnly state that the evidence you shall give in the matter pending before this Court shall be the truth, the whole truth, and nothing but the truth, so help you God?

THE WITNESS: I do.

THE CLERK: Thank you. Please be seated.

THE BAILIFF: Please state your full name and spell it for the record.

THE WITNESS: Monica Siewertsen M-o-n-i-c-a S-i-e-w-e-r-t-s-e-n.

THE COURT: Good morning, Ms. Siewertsen.

THE WITNESS: Good morning.

THE COURT: Your witness.

MR. THOMAS: Thank you, your Honor.

MONICA SIEWERTSEN, having been duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. THOMAS:

Q What's your current occupation?

A I'm currently employed as a criminalist with the Washoe County Sheriff's Department in Reno, Nevada.

Q How long have you been employed with the Washoe County Sheriff's Department?

A Since January of 2009.

Q And then prior to that, where did you work?

A I was a criminalist in the San Bernardino County Sheriff's Department in San Bernardino.

Q Do you remember what years you worked for the San Bernardino County Sheriff's Department?

A From 2002 until the end of 2008.

Q Prior to working with the sheriff's department in 2002, did you work for any other department as a criminalist?

A Yes. I was employed with the Royal Canadian Mounted Police in Edmonton Alberta in Canada as well as the Mesa Police Department in Mesa, Arizona.

Q How many years of experience do you have as a criminalist?

A Approximately 16.

Q Prior to becoming a criminalist, did you have to take special education courses or anything like that?

A I have an honors bachelor of science from the

University of Waterloo in Waterloo, Canada. I have six years of research experience in the area of molecular biology, which is utilizing DNA, in my instance, to help answer specific research questions.

Three of those years were at the Hospital of Sick Children in Toronto, Canada and three years with the King Faisal Specialist Hospital and Research Center in Riyadh, Saudi Arabia.

Q As far as your training is concerned, did you have on-the-job training also?

A Yes. At each of the police agencies where I worked, I was required to undergo written, oral, practical examinations, as well as demonstrating using training samples and reading articles demonstrating a competency in the area of the analysis that I performed at each of the agencies. That would be mostly DNA typing analysis.

Q As far as your current position at Washoe County, what do you do over there as a criminalist?

A I work in the forensic biology section. I perform the identification of biological materials. Then I perform DNA typing analysis in an attempt to determine the origin of those biological materials.

Q How long have you been doing DNA typing and working in the forensic biology area?

A Approximately most of those 16 years.

Q Then as far as the 16 years that you've done,

primarily working with DNA?

A Primarily, yeah.

Q And then did you have -- during those 16 years, how many cases have you worked on where you did DNA typing?

A I don't have an exact number, but I would say well over a thousand.

Q And then as far as your case load is concerned, eventually you had to go into court to testify on some of those cases?

A In some, I'm required to testify, yes.

Q How many times have you testified in court as an expert in DNA?

A I've been required to testify over 80 times.

Q As far as testifying in court, you said you've done that before.

Is that on different types of DNA or a specific type of DNA testing that you've done?

A The actual analysis type?

Q Yes.

A Yes. I've testified in several different analysis types, yes.

Q Then if you can explain to the jury, what is DNA?

A DNA stands for deoxyribonucleic acid. It's often referred to as blueprint of life because it does contain the information that allows us to be human, carry on our daily functions, and it also allows us to

pass our traits on from one generation to the next.

Q What type of items can you find DNA on?

A In humans, DNA is located inside all cells except for red blood cells. We're still able to analyze blood in a forensic situation because white blood cells are located in blood. That's where we obtain our DNA from.

An important factor for forensic DNA analysis is that no matter what the source of the cells -- the source of the cells, I mean, blood, semen, saliva, the roots of hair or tissue -- if it came from the same individual, it will give the same DNA typing profile. So we're able to compare different kinds of biological material and determine if they came from the same individual.

Q Okay. Up on the screen there is Exhibit 41.

May I approach?

(Whereupon Exhibit 41 was marked for identification.)

THE COURT: You may.

BY MR. THOMAS:

Q Can you explain to the jury what this exhibit depicts, Exhibit 41?

A Yes. This is a caricature to basically help to remind me of things to explain about the DNA molecules. As I've mentioned, DNA is located inside the cells in the human body. No matter what the source of those cells, if the cells came from the same individual, they

will give the same DNA typing profile.

DNA is packaged -- it's a very large molecule, as you can imagine, because it contains a lot of information. It's packaged in structures known as chromosomes. A chromosome is similar to a spool of thread. If you're familiar with a spool of thread, it may contain 10 or 25 or 50 yards of thread in a very small compact package that you could carry around. The large DNA molecule is wound around something similar to that spool of thread so it's able to be packaged in a very small area.

The English language has 26 letters or the English alphabet has 26 letters. We organize those letters into words and into sentences. That's how we're able to communicate with each other. The DNA alphabet consists of only four letters or four building blocks for the DNA molecule. They go by the letters A, T, G and C. It's the order of these building blocks along the DNA molecule in a certain stretch that imparts the information, the blueprint that the body follows in order to produce proteins and carry on functions.

These base pairs or building blocks pair in the rungs of a ladder. This diagram here is often how a DNA molecule is depicted. That is a double helix or twisted-ladder format. The outsides of the twisted ladder are like the outsides of the ladder -- the outside of the DNA molecule is like the outside of a ladder. The rungs are where those building blocks are

located.

If you divide those rungs in half, there's a base on each side of that half. Every time there is a T, the other half of the rung will always be an A. Every time there is a C on one half of the rung, the other half will always be a G. Because of that, if you cut a DNA molecule down the center in half and you take away half, you will always be able to reform the DNA molecule because of those base pairing rules.

That is in nature how we make more cells in our body, and how we repair injuries, how we grow, and also how we're able to pass our traits from one generation to the next. We use this particular technique in the laboratory in order to make copies of particular areas along the DNA molecule we're interested in during our analysis.

Q That's also known as the extraction process or that's done during the extraction process?

A That's -- the making of the copies is actually done after the extraction process during the PCR or polymerase chain reaction stage.

Q And then in this particular case, did you perform some sort of DNA analysis?

A Yes, I did.

Q Okay. And what was the LR number of this particular case?

THE WITNESS: Your Honor, may I refer to my notes to refresh my recollection?

THE COURT: You know, you can do it anytime you want to just do us a favor and just tell us, I'm going to be referring to my notes.

THE WITNESS: Okay.

THE COURT: Thank you.

THE WITNESS: The LR number in this case is 44659.

BY MR. THOMAS:

Q Was there also a DR number that was attached to this particular case?

Foundation

A Yes.

Q What was the DR number?

A 1331036 dash 07.

Q Were there certain items that you analyzed regarding this particular LR number, LR Number 44659?

A Yes.

Q What were those items?

A Referring to my report, the particular items that I analyzed was A dash 11, which was a vaginal swab from Rita Cobb.

Q And then as far as that A dash 11 is concerned, did you have to actually do an extraction of the DNA of that particular item?

A I did not. These were actual tubes which contained liquid. That liquid was DNA that had been previously extracted from the vaginal swabs.

Q Then you talked about the PCR.

Is that done by you after you get a liquid?

A Yes. The steps, basically, of the DNA analysis is to remove the DNA from whatever biological material that you're looking at, and then to determine how much you have because DNA analysis is like following a recipe. We want to know how much DNA we have in order to add the correct amount to our recipe.

Then we want to make a number of copies of the particular areas of the DNA molecule that we're interested in targeting. Then we want to analyze or determine the differences or results at each of the areas that we look at.

Q So you made the copies of the DNA for Item A dash 11?

A I did.

Q Can you explain whether or not during that process there were any abnormalities that you saw?

A The fact that the record is written means that there was no reason to doubt the results at the end of the analysis.

At each of the steps, there are positive and negative controls that are carried through that analysis to make sure that the process worked correctly, we obtain the correct results from the positive control, and that no results are obtained from the negative control. That serves to show there's no inadvertent addition of an unknown DNA sample.

In this particular case, once I complete my analysis and write a report, my complete file is given

to a second individual to go over my analysis and to agree with my conclusions before the report is released. So there's no reason in this particular case to doubt those results.

Q Okay. And that copying that you did, that was in accordance to generally accepted scientific procedures in the scientific community?

A Yes, as well as being validated within the laboratory before they're used for case work.

Q And you did that in accordance with the training that you received?

A Yes.

Q And then did you eventually obtain a DNA profile or multiple DNA profiles from Item A dash 11?

A Yes, I did.

Q Can you tell us how, once you develop a DNA profile, how that profile is developed, what you're looking at in order to get that profile?

A Yes. As I've mentioned, we target 13 areas along the DNA molecule. The DNA that we have, half of our DNA is inherited from our mother and half of our DNA is inherited from our father.

I had mentioned earlier that we have 46 chromosomes. We have 23 chromosome pairs. The half inherited from your mother, the half inherited from your father. When we look at any one area on the DNA molecule, there are two copies of that area, the one that you inherited from your mother, the one from your

father. When you target that area and do your analysis and look for your result, you actually expect to see two results at that area. The actual result is a length of DNA.

The particular analysis that I perform is called short tandem repeat analysis or STR analysis, and what that analysis entails is the particular areas that we're interested in, if we take one of those areas, everyone in the world has the same core order of building blocks at that location. For example, A, A, T, G. That's the order of the building blocks at that location. Everybody has that order.

What differs from person to person is the number of times that that core sequence is repeated at that particular location. One individual may have one of their chromosomes that has four of those repeat units, and the other of their chromosome has two of those repeat units. At that one location, that individual's DNA typing result would be a 2, 4. Someone else using that same particular location will have that same core sequence, but they may have three repeat units at one area or one of the chromosomes and two repeat units at the other chromosome. Their DNA typing result at that one location would be a 2, 3.

So a DNA typing profile is a accumulation of those numerical results at each of the areas that we look at on the DNA molecule. We attempt to look at 13 areas.

Q Before we go on to the 13 areas, I'm going to show you what's been marked Exhibit 43.

Is that an illustration of what you just discussed as far as a short tandem repeats?

(Whereupon Exhibit 43 was marked for identification.)

THE WITNESS: Yes.

BY MR. THOMAS:

Q I notice on Exhibit 43, that there's a group of rectangular blocks with the letters A, G, A, T in there, and then next to it say four alleles and then on the bottom is another group of rectangular boxes with those same letters and next to that is the six allele.

A Yes.

Q As far as the DNA type, that would be 4 comma 6?

A Correct.

Q What if it was, hypothetically, let's say the second one is also four alleles?

A That is possible. Each of the areas that we look at, there is not an infinite number of possibilities or infinite number of links at that particular area. There's a finite number of results. So it is possible that an individual may coincidently inherit the same result from both parents.

The length of the fragment or the number of repeat units would be the same and the result of that location would be written as a 4, 4 or may be written

just as a 4.

Q So when you only see a single number, that means that that same number is a duplicate and you see a Number 4 all by itself that means there's two 4s there?

A That's correct.

Q You were about to talk about the 23 chromosomes and the locations. Let me show you an exhibit. I'm going to show you what's been marked Exhibit 42.

Can you explain what's depicted in Exhibit 42 for the jury?

(Whereupon Exhibit 42 was marked for identification.)

THE WITNESS: Yes, this is a representation of the 23 chromosome pairs. 22 of the -- of the pairs, each half of the pair is identical to the other half. The 23rd pair, which is demonstrated in the bottom right corner, are the sex determining chromosome. A female will have two Xs and a male an X, Y.

We look at 13 areas along the chromosomes labeled 1 to 22, and we look at an area on the X and Y chromosome to determine whether the donor of the biological sample is a female or a male.

BY MR. THOMAS:

Q I notice on Exhibit 42, there appear to be several chromosomes with no numbers on them.

Do you see that?

A Yes.

Q Are those chromosomes that aren't actually examined?

A That's correct. We do not look at areas on those particular chromosomes.

Q And each area that you examine is designated, it looks like, with a number?

A That's correct. Basically, what that value is in the yellow is a DNA address. If I say to you that an individual lives at 201 Birch Street, if you're familiar with the city we're in, then you would know where 201 Birch Street is.

These destinations are what microbiologists use to know where a particular piece of DNA is located. For example, on the second row, the number is D13S317. Basically, that means that that's a DNA fragment. It's on the 13th chromosome. It's a single unique sequence that is found only once on the DNA molecule. It was in this particular case the 317th one characterized on the 13th chromosome.

Q I notice it looks like Chromosome 5 has more than one?

A Yes.

Q Is that the only chromosome that has more than one?

A Yes. They are located on opposite arms of the chromosome. They are far enough apart on the chromosome that they are considered independent of each other.

Q How unique are these numbers we're talking

about as far as these short tandem repeat numbers? Are they unique to each individual when you look at them all 13 loci?

A Do you mean the overall DNA typing profile?

Q Yes.

A The more information you have, the more areas you obtain results for, the more individualizing a DNA typing profile is. As I mentioned earlier, each area only has a certain number of possibilities. One of the areas has eight possibilities. With all the people in the world having to have two of those eight possibilities, obviously lots of people at that one area are going to have the same result.

The power of individualization for DNA typing analysis comes in looking at a number of areas. An example for a car would be if I tell you I'm looking for a white vehicle, that's a good piece of information because I'm able to eliminate all other colored vehicles as being the one that I'm looking for. It's -- there's lots of other white vehicles around. If I then tell you that I'm looking for a white vehicle that has two doors, I can now exclude all white vehicles that have more than two doors. For each additional piece of information I give you, it's less likely I'm coincidentally going to find a vehicle that fits that description.

For DNA typing analysis, the same is true. If the frequency of occurrence of a result at one area is 1 in 10, well, I'm able to exclude nine out of ten people,

but there's lots of people out there that are going to have that same result. If I then have a secondary result and the frequency of occurrence of that second area is 1 in 10, because the two areas are totally independent of each other and what I obtain at one area has no affect on what I obtain on the second area, we're able to multiply the frequency of occurrence of the two areas together. So the two results will be found in 1 in 100 people.

If I then look at a third area, that third area has a frequency of 1 in 10. The combination of those three results would be found in only 1 in 1,000 people. So for each additional piece of information I give, the less likely it is that someone else is going to coincidentally have those results.

By looking at all 13 areas, we're going to come up with a DNA profile where it is unlikely that another individual would match that profile.

Q So as far as these profiles are concerned, are you able to get a DNA profile with those 13 points in every case?

A No.

Q In some cases are you limited to maybe three or four or five or six?

A Yes. Earlier, I mentioned that performing DNA typing analysis was like following a recipe where we need to add certain amounts of each of the components. There's an optimum amount of DNA that we would like to

add to our reactions in order to obtain results at all 13 areas; however, it's possible that that much DNA just does not exist from the particular material we isolated it from.

It's still worth a try to perform the DNA typing analysis on that less-than-optimum amount because any piece of information that we have gives some information -- any result that we have gives some piece of information. The example of cars, if all I'm able to tell you is that I'm looking for a white vehicle, that's still a piece of information. So it's useful. In DNA typing analysis, if the amount of DNA present is not optimum amount, it's possible we don't obtain results at all 13 areas.

If the DNA has been around for a long time and subjected to not optimum conditions, the DNA may be in what we call a degraded form, and we may not obtain results at all areas. If we don't obtain results or when we obtain results, whether those are complete or partial, we attach a statistical significance to that result to give some idea of how common or rare the result that we obtain is in the population.

Q As far as this particular case, were you able to obtain a DNA profile from Item A dash 11?

A Yes, I was.

Q Was it a partial profile or was it a full profile?

A Referring to my table summary result, I was

able to obtain a full profile from both fractions of this particular sample.

Q And you said both fractions, could you explain to the jury what you mean by both fractions?

A Yes. In this particular case, the extract that I worked with was from a vaginal swab. Generally, the purpose of examining a vaginal swab is to look for a donor of a semen sample that may be present. A vaginal swab we would expect to have epithelial cells, which are from the vaginal wall of the individual the sample was taken from as well as sperm cells, if there is a semen donor.

We do what's called a differential extraction, which helps to attempt to separate those two cell sources. There were two fractions, a non-sperm or female fraction and what we call a sperm fraction or the fraction that is enriched for the male component of any DNA that's present.

Q Did you do that separation or was that done for you prior to you looking at Item A dash 11?

A That separation was done prior to my analysis.

Q Okay. So that would have been done by Don Jones, according to the paperwork that you have?

A That's correct.

Q Then let me show you what's been marked Exhibit 44.

Did the Court want to take the noon recess at this point since this will be a good time to break?

THE COURT: If this is a good time for it, we're not quite at noon, but if this is a good pausing point, we'll do that.

Ladies and gentlemen, we'll start back at 1:30. You're admonished that it is your duty not to converse among yourselves or with anyone else about any matter connected with this case nor form or express an opinion on it until it's submitted to you.

Ms. Siewertsen, see you back at 1:30 as well.

(Whereupon the lunch recess was taken.)