STATE OF WISC	CONSIN,	
	PLAINTIFF,	JURY TRIAL TRIAL - DAY 20
/S.		Case No. 05 CF 381
TEVEN A. AVE	RY,	
	DEFENDANT.	
ATE: MARC	H 9, 2007	
	Patrick L. Will: uit Court Judge	is
APPEARANCES:	KENNETH R. KRAT	
	Special Prosecut On behalf of the	tor e State of Wisconsin.
	THOMAS J. FALLO	Л
	Special Prosecut On behalf of the	tor e State of Wisconsin.
	NORMAN A. GAHN	
	Special Prosecut On behalf of the	tor e State of Wisconsin.
	DEAN A. STRANG	
	Attorney at Law On behalf of the	ne Defendant.
	JEROME F. BUTING	3
	Attorney at Law On behalf of the	e Defendant.
	STEVEN A. AVERY	
	Defendant Appeared in pers	son.
PA	RTIAL TRANSCRIPT	
Re	eported by Diane	Tesheneck, RPR

INDEX	
WITNESSES	PAGE
JANINE ARVIZU	
Direct Examination by ATTORNEY BUTING	6
Cross-Examination by ATTORNEY GAHN	65
Redirect Examination by ATTORNEY BUTING	96
Recross-Examination by ATTORNEY GAHN	103
Further Redirect by ATTORNEY BUTING	105
DR. SCOTT FAIRGRIEVE	
Direct Examination by ATTORNEY STRANG	107
Cross-Examination by ATTORNEY FALLON	156
Redirect Examination by ATTORNEY STRANG	189
Recross-Examination by ATTORNEY FALLON	194
INVESTIGATOR MARK WIEGERT	
Direct Examination by ATTORNEY STRANG	107
Cross-Examination by ATTORNEY FALLON	156
Redirect Examination by ATTORNEY STRANG	189
Recross-Examination by ATTORNEY FALLON	194
INVESTIGATOR MARK WIEGERT	
Direct Examination by ATTORNEY STRANG	196
Cross-Examination by ATTORNEY KRATZ	199
Redirect Examination by ATTORNEY STRANG	202
Recross-Examination by ATTORNEY KRATZ	204
2	

1	EXHIBITS	MARKED	OFFERED	ADMITTED	
2	499 500	33	104 104	104 104	
3	501	33	206	206	
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
			2		
			3		

1	THE COURT: At this time the Court calls
2	State of Wisconsin vs. Steven Avery, Case No. 05 CF
3	381. We're here this morning for a continuation of
4	the trial in this matter. Will the parties, again,
5	state their appearances for the record.
6	ATTORNEY FALLON: Good morning, your Honor,
7	may it please the Court, the State appears by
8	Assistant Attorney General Tom Fallon, District
9	Attorney Ken Kratz, and in a very short moment,
_0	Assistant District Attorney Norm Gahn on behalf of
.1	the State.
_2	ATTORNEY STRANG: Good morning, your Honor,
.3	Attorneys Jerome Buting and Dean Strang appearing
4	with Mr. Avery.
-5	THE COURT: Very well. The defense may
-6	call its next witness at this time.
_7	ATTORNEY BUTING: Okay. The defense calls
-8	Janine Arvizu.
9	THE CLERK: Please raise your right hand.
20	JANINE ARVIZU, called as a witness
21	herein, having been first duly sworn, was
22	examined and testified as follows:
23	THE CLERK: Please be seated. Please
24	state
5	ATTORNEY FALLON: Could we have just one

1	moment for Mr. Gahn, this will be his witness. He
2	apparently is momentarily delayed.
3	ATTORNEY KRATZ: It will just be a moment,
4	Judge, he's carrying some things in.
5	THE COURT: All right. I will allow the
6	Clerk to swear the witness, and then we'll wait for
7	the examination until Mr. Gahn gets here.
8	ATTORNEY FALLON: Thank you.
9	THE CLERK: Please state your name, spell
10	your last name for the record.
11	THE WITNESS: My name is Janine Arvizu,
12	A-r-v-i-z-u.
13	ATTORNEY BUTING: This microphone has been
14	a little bit touchy the whole time, so we'll try it
15	right about there.
16	THE WITNESS: Okay. Thank you.
17	ATTORNEY GAHN: I'm so sorry, your Honor.
18	I was held up on something. I apologize to the
19	Court.
20	THE COURT: All right. Mr. Buting, you may
21	begin.
22	ATTORNEY BUTING: Thank you, your Honor.
23	DIRECT EXAMINATION
24	BY ATTORNEY BUTING:
25	O. Ms Arvizu, would vou tell us vour occupation.

- 1 please.
- 2 A. Yes, I'm a Laboratory Quality Auditor.
- 3 Q. Okay. And how are you employed?
- 4 A. I do independent contracting for people who use
- 5 analytical data and want to understand how much
- 6 reliable -- how reliable and how valid the data
- 7 are.
- 8 Q. Okay. And before I get into that a little bit
- 9 more, would you tell me, first, what your
- 10 educational background is?
- 11 A. Yes, sir. I have a Bachelor of Science in
- Bio-Chemistry from Cal Poly in San Luis Obispo
- and a ABD in Chemistry from the University of New
- 14 Mexico. And I'm certified as a quality auditor
- by the American Society for Quality.
- 16 Q. Okay. And what is an ABD?
- 17 A. ABD is all but dissertation, it's, essentially,
- 18 that you have completed all the course work and
- 19 examinations for a Ph.D. but did not complete the
- 20 dissertation.
- 21 | Q. Okay. Maybe just explain to us why you got to
- 22 that point and didn't complete your Ph.D.?
- 23 A. I accepted employment with one of the DOE,
- 24 Department of Energy, National Laboratories, to
- continue the work I was doing my dissertation on,

- that was funded by the Department of Energy.
- 2 After I accepted employment and started working,
- 3 we lost funding for that project, so I elected to
- 4 keep the job rather than go back to school.
- 5 Q. Okay. And do you have exhibit -- I'm sorry, what
- 6 is the exhibit number in front of you?
- 7 A. 499.
- 8 Q. 499. Can you just identify that for the record?
- 9 A. It's a copy of my resumé.
- 10 Q. Okay. And does that summarize your educational
- 11 background, as well as your areas of expertise
- and your professional experience?
- 13 A. Yes.
- 14 | O. All right. We'll talk a little bit about your
- professional experience in a minute, but, first,
- 16 the chemistry that you are involved with, is that
- 17 analytical chemistry?
- 18 | A. Yes.
- 19 | O. And what is a lab auditor and who uses them?
- 20 A. A lab auditor is pretty much similar to what you
- 21 would expect for an auditor of any other
- 22 discipline. Lab auditors go into laboratories
- and, essentially, look at how reliable and how
- valid the data are that are reported by a
- 25 laboratory.

The people who use lab results, it's not like buying a pound of sugar or buying a pound of flour, different laboratories produce different quality data. And so if the data that are being used by a data user are real important and they make real important decisions based on those results, then they can hire an auditor to come in and look at the lab's operations and see whether or not the lab was operating in accordance with good scientific principles and had good quality control practices at the time the laboratory work was done.

And so, over the course of my career, the majority of my work assessing data quality and looking at labs has been done for the federal government, because they are probably the biggest consumer of laboratory results. They use a lot of analytical results. And so it's real -- And they make very important decisions based on those results, so it's real important to them to understand how reliable and how valid their data are.

Q. Does your employment -- or has your professional experience involved review of commercial, private laboratories exclusively, or government

exclusively, or combination, or what?

A. Mm-hmm. I have conducted audits of both commercial and government laboratories. Because, again, the government both operates its own laboratories and contracts with commercial services.

So I have audited state laboratories, federal laboratories, commercial laboratories, in a wide variety of disciplines. These are labs that test environmental samples, food samples, pharmaceutical samples, the whole manufacturing, a whole gamut of samples.

- Q. So what -- what arm of the federal government would employ you to do an audit of another government lab? I mean, you know, one part auditing another part, right hand, left hand?
- A. I'm not sure that's exactly the way it happens.

 For example, I would be contracted by the U.S.

 Navy to audit the laboratories that did

 analytical work for the Navy. So that would

 include both Navy laboratories, actually staffed

 by Navy personnel, as well as commercial

 laboratories.

So, it was -- And the Navy, if you will, was the user of the results, and so they wanted

- to know how much confidence they could have, but it included -- I guess they were in a different part of the Navy, if that's what you mean.
- Q. Okay. And why is it important that a government lab or a private lab be audited?

A. Experience has shown, in the business of science, you know, it's really, really hard to do science on a production line. I managed an analytical lab for the Department of Energy for a number of years, and it's a really, really hard job to do.

And that's what we're really asking of these laboratories who are testing unknown samples, is to practice science day, after day, after day, in a highly defensible and valid manner. It's a really hard job.

And the -- Experience has shown in the measurement in science business, that the best way to insure the reliability and the validity of the results is to have a very rigorous, quality assurance program in place.

It's not a management gizmo of the week; it's a very technically driven job to put in place quality control practices and measures, to ensure that you consistently and reliably produce good quality data.

And so that's what drives it, ensuring that you understand the quality of your data and that your data is good enough so you can make good confident decisions based on them.

- Q. And does the -- does the government, federal government in the instance -- in the situation that you had some experience in, do they ask for audits of -- let's say, let's go to private labs first a minute, just to check up and see if they are okay, or are they sometimes concerned about more serious things in the use of tax dollars?
- A. It's a little bit of both. And the nature of the problems can be either that the lab doesn't know they have a problem, so when you go in as an auditor you're identifying a problem that they were largely unaware of.

For example, I did some work for the
Navy where they were interested in the presence
of a particular contaminant in bay water. And
the laboratory reported that it was not detected.
Lots and lots of samples, it was a very expensive
analysis. It was hundreds of thousands of
dollars worth of analysis in question, and the
laboratory reported it was not detected.

But when I went in and audited the

laboratory, I saw that the laboratories detection limit was way up here, and the detection that the Navy was interested in, where they knew they had to pay attention to, was way down here.

So the fact that the lab said it wasn't detected at this very concentrated level, really didn't answer the Navy's question, and so they ended up not having to pay for all that analysis, because it really -- although, it's true that the lab didn't detect it, it was really inappropriate for the Navy's use, and so they ended up not having to pay for it.

- 13 Q. So you saved the Navy some money --
- 14 A. Mm-hmm.

- Q. -- by showing that the laboratory just didn't provide what was asked for?
- 17 A. Correct.
- Q. Okay. And has some of your investigation also involved, or uncovered, any kind of fraudulent practices by laboratories, government or otherwise?
- A. Yes. One of the things that you do as an auditor
 is, is you try to reconstruct things after the
 fact. All I'm dealing with, after the fact, is a
 pile of paper. And so I'm trying to reconstruct

everything that happened with that sample, from the time it was collected in the field, all the way till it was ultimately reported on a piece of paper in a lab report. And try to understand whether all the controls were in place, and the integrity of the sample was maintained, and the results are valid and reliable.

So that's the whole process. And I have kind of forgotten the beginning of that question, I apologize.

- Q. Whether or not you have had any experience in detecting, or anything fraudulent.
- A. During the course of that process, for example, at a commercial laboratory, I determine that although it appeared that they had results and they had data, the paper data that looked like results, when you put it altogether, I realized that they were actually reporting more data than they had the capacity to generate with their instrument. It was like they only had the ability with their instrument, for how long the method took, to run one sample in one day, and they were reporting results from many samples in one day.

That meant that they were -- in our

- local term it's "dry labbing", they were making
- 2 up results. They weren't testing the samples;
- 3 they were just making up the results. Obviously,
- 4 a clearly fraudulent practice that the government
- 5 doesn't want to pay for.
- 6 So that's the kind of big picture
- 7 perspective that you look at when you try to
- 8 audit laboratories.
- 9 Q. And as a result of some of your work or
- investigations, has there been any criminal
- 11 penalty -- criminal or civil penalties imposed on
- labs when they do that sort of thing?
- 13 A. You know, I just -- I just report it to the
- 14 government. I don't know what they do as a
- 15 follow-up.
- 16 Q. Okay. By the way, I don't know if it was made
- 17 clear, but what is your -- where -- who do you
- 18 | work for now?
- 19 A. In this case?
- 20 Q. No, I'm sorry. What's your employment, your
- 21 business?
- 22 A. I'm an independent contractor in my -- in my
- assessment duties as a forensic.
- 24 O. Okay. Where is it based?
- 25 A. In the Albuquerque, New Mexico area.

- Q. Okay. Do you work -- do you have any limits on where you work, or are you all over the place, or what?
- A. I'm all over the place. I get data from all over the country, even from overseas. I have testified overseas as well.
- Q. And you have been doing this for approximately how long?
- 9 A. Well, I have been auditing labs and doing data
 10 quality assessments for many, many years. But do
 11 you mean, specifically, in the forensic
 12 discipline?
- 13 Q. Sure.
- 14 A. In the forensic discipline, since the late '90's.
- Q. Okay. And in terms of auditing labs, in general, how long has your career been in that?
- 17 A. Since the '80s.
- 18 Q. And have you published any articles or anything?
- A. The business of data quality assessment, I'm

 working for the people using the results, and

 they generally have proprietary use to the

 results that I report to them. However, when I

 was working for the Navy, I actually authored

 their quality standard that they used for the

 evaluation of laboratories. And it, essentially,

- 1 was the rules of the road for government
- 2 commercial labs that they wanted to work for the
- Navy.
- 4 Q. All right. Are you familiar with -- We have had
- 5 some testimony about different types of
- 6 instruments that analytical chemists use. Are
- 7 you familiar with liquid chromatography?
- 8 A. Yes.
- 9 Q. And mass spectromety -- spectrometry?
- 10 A. Yes.
- 11 Q. And the instruments that are used for those kinds
- of tests?
- 13 A. Yes.
- 14 Q. Have you operated those kinds of instruments?
- 15 A. I have operated both.
- 16 Q. Okay. Can you tell us what a protocol is?
- 17 A. Mm-hmm. A protocol simply describes how a
- 18 | laboratory does a -- performs a particular
- 19 method. It sets down the recipe, if you will,
- 20 for how they treat samples and what controls they
- 21 introduce, what it takes to have acceptable
- 22 performance or not.
- 23 Q. And as part of your auditing process, when you go
- 24 to a lab, what things do you look at; is it
- 25 people, instruments, method, what?

A. And then some. The process of doing an on-site laboratory audit, personally, I find it very, very interesting, because you always see things in person that you will just never see on the paper.

So, on-site, I'm looking at everything from how they actually perform the manipulations; whether they use good laboratory practices; whether they seem to understand the principles of contamination control, which are so important in a laboratory; to looking at the heating, ventilating, and air-conditioning system. I'm looking to see where the make up vents provide air, to see whether that could be a potential contamination problem.

I'm looking at how they set up instrumentation. I'm looking at the documentation maintained by the lab. I look at everything.

- Q. You look at the, specifically, protocols; is that something that you examine, consider, and evaluate in the process of doing these lab audits you refer to?
- A. Absolutely. Always read the protocols before going on-site, to understand how they say they do

their method, and then watch them and look at the written work that they generate to see whether they, in fact, followed their method.

The nature of chemistry is such that it's so very important to follow protocols. For any time that you deviate from a protocol, then you have got to make a note of it.

It's a lot like a recipe. Again, if you don't follow the recipe exactly, then that chocolate cake isn't going to be as good as the one that grandma makes. But if grandma doesn't want to share her recipe, and she leaves out ingredients, or doesn't really follow hers exactly, you're not going to be able to reproduce her work.

The same thing applies in the laboratory. As scientists, we want to be able to reproduce somebody else's work. That means they have to have a completely documented protocol and they have to follow it.

Q. And do you also, as part of this analysis that you go through, consider whether or not the protocol is being used for the purpose that it's intended and whatever limitations there may be in its actual scientific validity?

- A. What you are referring to is, essentially, deciding whether or not a method is valid. A method that's perfectly acceptable for use in one application may be completely inappropriate for use in another application. So it's really essential to understand exactly the scope of what you are trying to use the results for.
 - When I managed the Department of
 Energy's Analytical Laboratory, people were
 always calling me up on the phone asking me: So,
 can you analyze for beryllium? Yes, sir, I can.
 And how low can you go? What detection limit can
 you detect, they would ask me. And I would stop
 and say: Depends on what question you are trying
 to answer. Because you use different methods
 depending on different applications of the
 results.
- Q. All right. Did you -- Did you have an opportunity to review a report by a Dr. Marc LeBeau?
- 21 A. Yes.

- 22 Q. And do you know who he is?
- 23 | A. I do.
- 24 O. Okay.
- THE WITNESS: Excuse me, is it okay if I

- get a drink of water?
- 2 ATTORNEY BUTING: Sure, isn't there one?
- 3 THE WITNESS: Yeah, thank you.
- 4 ATTORNEY BUTING: Usually there's some up
- 5 there.
- 6 Q. All right. I'm going to show you some exhibits
- 7 that have been marked earlier in this case and
- 8 see if you can identify or recognize them. Do
- 9 you see Exhibit 435?
- 10 A. Yes.
- 11 Q. And what is that?
- 12 A. That's a copy of the FBI Laboratory's report in
- this case.
- 14 O. By?
- 15 A. Authored by Marc LeBeau.
- 16 Q. Okay. And have you reviewed that report?
- 17 A. Yes.
- 18 | Q. All right. And I'm going to show you what's
- 19 Exhibit 434. And tell us what that is.
- 20 A. This is a nine page standard operating procedure
- 21 by the FBI Laboratory that describes their
- 22 procedure, their recipe for analysis of EDTA in
- 23 dried bloodstains.
- 24 O. Okay. And the date of --
- 25 A. This particular procedure is dated 2/15/2007.

- Q. Okay. And then, also, Exhibit 446, can you identify that?
- A. Well, without looking at every page, this looks
 like the package that I received for review in
 this case, that consists of a letter from your
 office, as well as all the materials received
 from the FBI Laboratory in this case.
- 8 Q. Okay.

19

20

21

22

23

24

- 9 A. It's about the right size.
- 10 Okay. The -- Going to the report, do you have an Q. opinion whether this protocol, as reported in the 11 12 report -- the use of this protocol as reported in 13 the report -- can determine, with scientific 14 validity, whether -- if a stain is tested for 15 EDTA under this protocol, and not found, whether 16 that -- a conclusion can be given that it was not 17 present in the stain?
 - A. I do have such a conclusion, and it's based on more than just the procedure, but the fact that a stain -- EDTA is not detected in a stain, does not mean that EDTA was not present in the stain.
 - Q. Okay. Do you have an opinion about whether -- if one tests three stains and gets some results, or lack of results, whatever, whether one can express an opinion about what may or may not be

- 1 in three untested stains?
- A. Well, I'm in the business of analytical
 chemistry, and we're not in the business of just
 making guesses about what might be in samples; we
 have instrumentation to test samples and that's
 how we determine results. There's no way for an
 analytical chemist to know what's in a sample
 unless we test it.
 - Q. All right. Going more particularly to the materials that you reviewed, let's talk about the protocol for a moment. It's 434, I believe.
- 12 A. Yes.

- Q. There's a section called scope, does the protocol appear to be adequate for the scope, as it's defined?
- A. Yeah, it's a very short description of scope and it's an accurate description of the applicability of this method. It states that this procedure allows for the screening and confirmation of EDTA in suspected bloodstains. So that's exactly what it does, it allows you to screen for EDTA in a bloodstain and to detect EDTA in a bloodstain. I will mention that that's probably the shortest description of method scope I have ever read.
- Q. Okay.

- A. They are generally much more -- there's a little
 more scientific meat in it in terms of describing
 under what conditions and so forth.
 - Q. Does this protocol, as its designed, or reportedly designed here, you say that it -- if one follows this recipe and there is EDTA present, that this protocol would allow one to detect it; is that right?
- 9 A. To detect and identify it.

- Q. Okay. Is it also possible, from this protocol, to draw any conclusions, though, if one runs the tests and does not detect EDTA?
- A. That's really the problem. The issue with this procedure is not whether or not it's a valid result, if you were actually detecting EDTA.

 This is a good method. If the results end up that you detect EDTA and you identify EDTA, that's a good -- good indication that EDTA was present in that sample.

The problem really occurs when EDTA is not detected in a bloodstain. And the problem in that regard is, from this method, I don't know whether that's simply because they didn't detect it, or because it wasn't there. I can't tell the difference between those two, for this method.

- I don't know, really, what their method

 detection limit is. So I don't know whether they

 didn't see it or it wasn't there.
- Q. Okay. You mentioned method detection limit; is there also something called instrument detection limit?
- 7 A. Yes.

17

18

19

20

21

22

23

24

25

- Q. And as you look at this protocol -- or I'm sorry -- look at the report for a moment, on Page 2, where Mr. LeBeau indicates that, using the procedure employed in this case, EDTA is readily identified at a concentration of 13 -micrograms?
- 14 A. Milligrams per litre. The common term is parts
 15 per million.
 - Q. Okay. As you go through his -- the stack of data there that was provided to you, is that a instrumentation limit or is that a method limit?
 - A. From reviewing the data, that appears to be an instrument detection limit. That is, they figure that out by starting out with a 100 PPM sample and they would inject that right into the instrument and see if they could see EDTA. And they did.

So they cut it in half, diluted it in

half, and ran it again. When they ran 50, they still detected EDTA. And each time they cut it in half. When they ran 25, they detected EDTA. When they cut 25 in half, at 12.5, or 13, they still detected it. But when they cut that sample in half and cut it down to about six parts per million, they were not able to detect and identify EDTA.

So based on that, they drew the conclusion that their detection limit, or limited detection as they called it, was 13 parts per million. That, however, represents sort of the theoretical best case of injecting a sample directly into the instrument.

It does not reflect the detection limit for going out and swabbing a stain and extracting the sample from that stain and diluting it before you get it into the instrument. Those are two different things. Instrument detection limits are usually very small. Method detection limits are larger. That's just sort of the natural order of things.

Q. Okay. Well, focusing specifically on this type of a method detection limit, why would it be different; why would you be able to detect a

smaller amount if you just inject the sample directly into the machine versus if you have to go through the process of taking a dried stain, swabbing it, extracting that, diluting it, all of that? Why is there a difference?

A. The difference is really because there are so many other complicating factors associated with taking a real world sample and getting it to the point where it's clean and pristine enough to be able to inject it into an instrument.

In the case of a bloodstain, that sample is on a surface, it has to be removed from that surface. So it's swabbed. There may be interferences from the swab. They may not completely recover the stain.

Then they try to extract the blood sample off of the swab. Extractions, generally, are not completely efficient. In some of the reference material in this case, some work done some years ago, extraction efficiencies were typically 90 percent or so, on a first run. It was quite common, if you do multiple extractions, to extract more DNA so -- or more EDTA.

So in each -- in each step of the process, you will lose a little bit. There's

- issues that arise. And so, by the time you get to the instrument, your effective method detection limit is much higher.
- Q. Is it possible to determine what the effective method limitation is, in this case, from the materials you reviewed?
- 7 A. No, it is not.

22

23

24

- Q. Do you have an opinion whether it is the actual effective method limit of this -- this test, to be able to detect EDTA in a bloodstain, is higher than 13 parts per million?
- 12 A. Yes, I do, and I believe that it is.
- 13 Q. Can you quantitate how much higher?
- 14 Unfortunately, that's -- that's a study that's Α. 15 best done empirically, by actually doing 16 analytical work. Method detection limits are 17 best determined using actual analytical work. Ι 18 can infer some information from the data that 19 were obtained in this case, but I can't just 20 compute one from the data that are available.
 - Q. And looking at the data that is available in this stack, the validation tests that were done, and those sorts of things, is there any indication that the FBI ever found out what the actual detection limit, or method detection limit, would

be for this kind of a test?

- 2 A. No, there's no such indication in these data.
 - Q. Okay. Well, what does that tell you about the use of this kind of a protocol?
 - A. This kind of protocol, there's basically two things that can happen when you run this kind of a method; either you detect EDTA or you don't. From an analytical perspective, the results either say, yes, we detected EDTA, or, no, we did not.

This report makes it seem like those two outcomes only can arise from two conditions. And it makes it seem like if the answer is, yes, we detected EDTA in a bloodstain sample, then it kind of makes it seem like, then that means it must have come from a tube of EDTA preserved blood.

There is -- There was reference to the fact that the control samples that they took from the car were blank, so that's probably the more likely interpretation.

The problems really come if the results from testing are, no, there is no EDTA present in those samples. Nothing there. We didn't see anything.

The problem is, you just don't know whether EDTA -- you didn't detect EDTA because there was none there, or because your detection limit wasn't low enough to see it, even if it had been there. That's really the problem.

So just because EDTA is not detected by the laboratory, doesn't mean that -- that that blood sample came from somebody actively bleeding onto that spot. It still means, that if your detection limit is out of sync with the samples in question, there could be EDTA in those samples from that blood tube, you just didn't see it.

- Q. All right. Now, the next sentence in his report, Dr. LeBeau's report, talks about, that EDTA is also detectable when a 1 microliter drop of EDTA preserved blood is analyzed. As you reviewed the data in that four or five inch package there, would you agree or disagree with that statement?
- Q. And why is that?

Α.

A. Because in the results reported by the laboratory, if this statement says, I tested a 1 microliter drop of blood from a purple-topped tube, from an EDTA tube, and I detected it, the problem is -- and that was done in this case --

I disagree with that statement.

the problem is, they ran a 2 microliter drop of EDTA preserved blood on a spot, a more real-world kind of application, and they did not detect EDTA in this lab.

Now, gosh, that might sound a little bit counterintuitive, what do you mean they could detect 1 microliter, but they couldn't detect -- they detected EDTA in a 1 microliter sample, but they didn't detect EDTA in a 2 microliter sample.

If, in fact, the detection limit used by this laboratory was down around that level, that's -- I just have to tell you, that's not an unexpected result. Sometimes you see it and sometimes you don't, if an element -- If a compound is present near it's detection limit.

In fact, that's, essentially, the definition of a detection limit. It means that if it's present at that concentration, sometimes you'll see it and sometimes you won't.

So to state that he -- that the lab is -- that EDTA is detectable when a 1 microliter drop of preserved blood is analyzed, is really not a true statement, even as evidenced by his own results, because he didn't detect it in a 2 microliter sample of blood.

- 1 Q. Could you maybe find the --
- 2 A. I will try.
- 3 Q. -- the information that's in there that you are
- 4 referring to? And I'm going to take just a few
- 5 moments to show that on the ELMO. You -- Did you
- 6 find it already?
- 7 A. Yes.
- 8 Q. Okay. I have a copy, let me just see if I can
- 9 work from my copy while you have that, or else
- 10 you can use my copy?
- 11 A. There's only two pages, which one do you want?
- 12 Q. Okay. Why don't you use mine and I will use the
- actual exhibit on the ELMO.
- 14 A. Okay.
- 15 Q. I'm going to start and just put this first --
- 16 first page of this stapled packet together.
- 17 A. Oh.
- 18 Q. Do you have that?
- 19 A. Yes.
- 20 Q. At the top it says the date of 2/16/07, 12:03:08?
- 21 A. Yes.
- 22 O. Okay. What is this?
- 23 A. This is, essentially, a set of data that came off
- the LC/MS instrument from running the entire
- 25 batch of case samples in this case. So it

- includes all the question samples, all the known
 samples, and all the control samples that were
 run by the laboratory in sequence, in time
 sequence, so you can sort of reconstruct what
 happened to -- which samples were run through the
 instrument plan. And, boy, you will never be
 able to read that on top.
- Q. I can zoom in, when we need to, believe me. And so is this kind of -- these kinds of reports are -- what do you call these, spectrographs, mass specs?
- 12 A. Yeah, it's chromatograms and spectra.
- Q. Are these the kinds of things that you see in your review of lab data?
- 15 A. On a regular basis.
- 16 O. Okay.
- 17 ATTORNEY GAHN: I'm sorry, could we have
 18 this marked as an exhibit so we know what we are
 19 talking about?
- 20 ATTORNEY BUTING: I think it is. It's
 21 part --
- 22 THE WITNESS: This is part of this big
 23 package, if you -- this big one that is called
 24 Exhibit 446.
- 25 ATTORNEY GAHN: I understand that, but I

would like that -- this exact page, so we know what 1 2 pages you are talking about. 3 THE WITNESS: Sorry. ATTORNEY BUTING: Would you like to do 4 5 that, your Honor. THE COURT: Is the page numbered in any 7 fashion? 8 ATTORNEY BUTING: No, there are no numbers. 9 THE WITNESS: Unfortunately, no. 10 THE COURT: All right. Then let's label it as a specific exhibit. 11 12 ATTORNEY BUTING: Okay. What I would like 13 to do, there's a stapled set, just mark them 14 altogether and then we'll talk about pages in there. 15 This includes all the samples that were run Α. 16 between 12:03 and 5:40 on February the 16th, in 17 time sequence order. 18 (Exhibit No. 500 marked for identification.) 19 All right. We finally made it to 500. Exhibit 0. 20 500, can you tell us what that is? 21 Α. Yes, this is a dataset that represents all the 22 results from running the case samples in this 23 case. They were run on February 16th. And they 24 started at 12:03 and ran through 5:51. And each

of these takes about 11 minutes to run, so the

- time dates on each of them are about 11 minutes
 apart.
- Q. Are these run, you know, sort of automatically, or robotically, or do you need to have a lab person there to do this?
- It's absolutely standard practice throughout the 6 Α. 7 industry, that these types of instruments -- it's called "rack and run". You set up your samples, 8 9 you extract your samples, you load the tubes into 10 a little auto sampler set in certain labeled positions. Then you let the instrument 11 12 automatically, or robotically, sample them; 13 typically, at night, while you are at home 14 sleeping, the instrument's in the lab working.
- Q. Okay. And then when you come in the morning, does it print out something like this for you?
- 17 A. Yes.
- Q. And these are, then, the reports that the analyst would review to determine if -- if it seems like the test ran properly, or didn't, and what the results are?
- 22 A. Exactly.
- Q. Okay. All right. Now, the first page of
 these -- I'm not going to bore everybody too much
 here with great detail, but at the top, just so

- 1 people understand, on the upper left, there's a
- 2 staple sort of blocking it, but it's like a -- it
- 3 looks like a computer path, right?
- 4 A. Yeah, it's the identification of the file. The
- 5 instrument's collecting all these data,
- 6 electronically, and that's just the file where
- 7 it's storing that data for the analyst to come in
- 8 and look at it the next day.
- 9 Q. So, for instance, where this says cali --
- 10 Xcalibur data/Brewer, Brewer being -- would be,
- in this case, the analyst?
- 12 A. Yes.
- 13 Q. Okay. And as you go over towards the center,
- then, it has the 2/16/07, that's the date and the
- 15 time?
- 16 A. Yes, that's the date and time stamp for the time
- 17 the data was acquired by the instrument.
- 18 Q. All right. And then over on the right, at the
- 19 top, what is that referring to?
- 20 A. That's a description of the sample --
- 21 O. All right.
- 22 A. -- that's entered by the analyst, at the time
- 23 they are preparing this set to run.
- 24 | O. Okay. And so in each of these -- or each of
- 25 these pages that I'm going to flip through, do

- 1 they is it one page per sample, typically, or
- 2 can you determine that by what's up at the top?
- 3 A. You have to determine that by what's at top.
- 4 Often -- Well, sometimes they can zoom in so
- 5 there will be more than one page. So I can't
- 6 give you --
- 7 Q. Okay.
- 8 A. -- a direct answer.
- 9 Q. Very good. So this first one is a blank negative
- 10 blood, and that would be -- that's one of the
- 11 controls you mentioned?
- 12 A. Mm-hmm.
- 13 Q. You have to say yes or no?
- 14 A. Yeah, that's a quality control sample.
- 15 Q. All right. The next one is negative control?
- 16 A. Yes.
- 17 | O. And then another blank?
- 18 A. Two more blanks.
- 19 Q. Two more blanks. Okay. And, then, K-2 extract,
- 20 what does that mean?
- 21 | A. That's one of the samples in this case identified
- 22 as K-2. And this is analysis of an extract that
- was prepared from K-2, from the K-2 swab.
- 24 Q. Okay.
- 25 A. So this isn't a case where they are actually

- 1 taking a liquid sample an injecting it to the
- instrument, because those blanks were, in fact,
- just liquid samples. This is a case where they
- 4 took a solid sample on K-2 and had to do the
- 5 extraction before they injected it into the
- 6 instrument.
- 7 Q. All right. And from your review of the
- 8 materials, do you know what K-2 refers to, in
- 9 general?
- 10 A. I could look it up. Under report, it's simply
- identified as two control swabs, Item 9802.
- 12 There's another record in here that describes
- where it was taken from, I don't remember right
- off the top of my head.
- 15 Q. Okay. The next page is another blank?
- 16 A. Yup.
- 17 | O. Two blanks, actually?
- 18 A. Yeah, there's always two blanks in between each
- 19 evidentiary sample.
- 20 Q. Okay. And is that done in part to get rid of the
- 21 possibility of effective carryover?
- 22 A. It's done to both get rid of the effects of
- 23 carryover and to be able to identify it in the
- event that it's happening.
- 25 Q. All right.

- A. It's a very good quality control practice.
- Q. And, by the way, let me just go back for a
- 3 minute, at the bottom, turn to the very first
- 4 page, at the bottom of each page there's some
- 5 handwriting; what does that refer to?
- 6 A. That's the initials of the responsible analyst
- 7 who essentially made the call. On each and every
- 8 sample, a qualified analyst is responsible for
- 9 deciding, well, is EDTA there, or isn't it; is it
- 10 detected, or positive, or is it not detected.
- 11 So -- And by signing it and making that
- entry on each page, that's acknowledgment that
- that individual has made that call. So in this
- 14 particular case, the little -- just looks like a
- sort of scribbled M's or something, that's the
- initials of the analyst who made the call, ND, or
- 17 not detected, for this particular sample.
- 18 Q. Okay. And since this is a blank, you would
- 19 expect it to be not detected?
- 20 A. You would hope so.
- 21 Q. However, there is a line on it, with a number,
- 22 223, at the top. Is this -- What does this
- 23 | indicate?

- 24 A. It indicates that blanks are not necessarily
- 25 always completely blank. But that particular

- 1 peak is not an indication that it's EDTA that is
- 2 present, so it doesn't create a problem for us.
- 3 Q. Okay. So it's something, but it's not -- it's
- 4 not EDTA?
- 5 A. That's correct.
- 6 Q. Okay. Move back ahead to where we were at Q-46
- 7 extract?
- 8 A. Yes.
- 9 Q. Okay. And this one he -- is there a call at the
- 10 bottom of that?
- 11 A. Yes, not detected.
- 12 Q. Okay. And then there's two more blanks, right?
- 13 | A. Yes.
- 14 | O. And the next is a K-3 extract?
- 15 A. Yes, not detected.
- 16 O. Okay. And then two more blanks?
- 17 A. Yes.
- 18 | Q. The second blank. Now, this one is a little bit
- 19 different, there's the 223 showing up, but
- 20 there's also a 293 showing up; what does that
- 21 tell you, if anything?
- 22 A. Again, it tells you that that particular item was
- 23 detected, but that does not meet the criteria for
- calling it EDTA, so it's something, but it's not
- 25 EDTA.

- 1 | Q. Okay. And so the conclusion of EDTA is, again,
- another ND, not detected?
- 3 A. That's correct.
- 4 Q. Okay.
- 5 A. They are really only looking for EDTA here. If
- there's other things present, there's no attempt,
- and, in fact, the method doesn't even allow for
- 8 identifying what the other things were.
- 9 Q. Okay. The next page, then, is Q-47 extract?
- 10 A. Yes.
- 11 Q. And you understand that to be one of the question
- 12 samples?
- 13 A. That's correct. It's a swab; it's a swab
- 14 extract.
- 15 Q. And could you understand that the -- the swab
- stains reportedly taken from the RAV4 were
- 17 designated 0-46, 0-47, and 0-48?
- 18 A. That's correct.
- 19 Q. Okay. And this one is called, also, ND?
- 20 A. Yes.
- 21 | Q. Okay. There is, again, 275 detected, but that's
- not a concern as far as EDTA goes, there's
- 23 something else?
- 24 A. That's correct.
- 25 Q. All right. Bear with me, two more blanks, K-4

- 1 extract.
- 2 A. Not detected.
- 3 Q. Not detected, even though there is, again,
- 4 something there that's 208, correct?
- 5 A. Correct.
- 6 Q. Two pages further, again, another blank, not
- 7 detected, but once again there are things showing
- 8 up, it's just not the ion --
- 9 A. They don't meet the rules for calling it an EDTA.
- 10 Q. Okay. And then Q-48 extract, not detected, as
- 11 well, right?
- 12 A. Right.
- 13 Q. Okay. Two more blanks. Now, lets talk about
- this for just a moment. You get to the page, it
- says Positive Control A (MAL EDTA extract). As
- 16 you review the data, what does this tell you, or
- what is -- what is this made of?
- 18 A. Well, from the data, from the record, it's not
- 19 really possible to tell. But my understanding is
- 20 that this is a sample prepared by Mark LeBeau.
- 21 MAL represents his initials and that he
- volunteered his blood sample for this particular
- 23 sample. And created -- created a purple-topped
- 24 tube, did an extract, and then determined that he
- was able to actually detect EDTA in this sample

- of his blood.
- Q. Now, is that -- would that be considered a proper positive control, in your opinion?
- 4 A. No, it is not.
- 5 Q. And why not?

15

16

17

18

19

20

21

- Control samples, there's rules, essentially, for 6 Α. 7 control samples. Control samples are of known origin and purity. They have been tested to 8 determine their actual composition. And then 9 10 there's typically a certificate of analysis that tells you, we have analyzed it and we note, with 11 12 this degree of confidence, that this is exactly 13 what's in this sample.
 - He, essentially, just took a sample out of the production line, his own, introduced it, and called it a positive control. So it's not, it doesn't really conform to sort of the -- the quality standard for what a positive control is.
 - Q. So when you say a certified known quantity, but here, this is a control in order -- he is using this as a control to -- just to find EDTA; is that right?
- A. Yes, to see whether he can detect EDTA during the course of this run.
- 25 Q. So what would be a proper positive control for

- 1 that?
- 2 A. If they had a whole blood standard, and there are
- 3 supply houses that sell those kind of whole blood
- 4 standards, that had a known quantity of EDTA
- 5 present in it.
- 6 Q. So there are commercial labs that sell certified
- 7 specific --
- 8 A. Yes.
- 9 Q. -- things like this?
- 10 A. Yes.
- 11 Q. And those are intended to be used as a positive
- 12 control?
- 13 A. That's correct. Those are reference materials
- intended for that use.
- 15 Q. Well, why would this be any different, if he puts
- it in a purple-topped tube?
- 17 A. Because he doesn't know how much EDTA is in that
- 18 purple-topped tube.
- 19 0. Okay.
- 20 A. So the fact that he detected it means it was
- 21 there, but how significant is that? Was that --
- 22 was that a very concentrated sample or a very
- 23 diluted one; he doesn't really know.
- 24 Q. Do -- Does the quantity of EDTA that one finds in
- 25 these commercially prepared purple-topped tubes

- 1 vary?
- 2 A. Yes.

- 3 Q. By how much, typically?
- A. I don't know. I wasn't able to find any very

 specific actual lab data reporting that. But in

 the FBI Lab's own protocols, they describe it as

 ranging typically from a thousand parts per

 million to two thousand parts per million. So

 it's a fairly broad range.
 - Q. Okay. Now, at the bottom of this, there's some handwriting as well. What does this appear to be, or what does this tell you?
 - A. Actually, this is an indication that, apparently, this person whose initials look like some kind of an M, went through and initially called this as a not detect. Because you have seen this quite a few times already this morning, the initials and then ND circled, but then subsequently the analyst went back and decided, you know what, I think this really meets the criteria for being able to call it EDTA, so they changed their mind, lined out the not detected and indicated that it was positive. And that's why there's a second M up there, they indicated when they made that decision to change that call.

- Q. Okay. And this is even on a sample of Mr. LeBeau's own blood?
- A. Yes. This is the sample of an extract prepared from Mr. LeBeau's own blood.
- Q. Okay. And, then, keep looking -- bear with me
 again -- another couple of pages of blanks. And
 then we get to something called Positive Control
 B, Q-49 extract; what is this?
- 9 A. I have to interpret this based on the information
 10 you see there. They are calling this a positive
 11 control, a second positive control, in this run.
 12 However, it's an extract of Q-48, which --
- 13 Q. Q-49?
- 14 Q-49, excuse me, which tells me it's a question Α. 15 sample, it actually is an extract of Q-49, which 16 is the liquid blood sample from Mr. Avery. Why 17 they are calling it a positive control, truly is 18 a puzzle to me. That is not what a positive 19 control is. This is a question sample. It's a 20 case sample. It's an unknown sample, as far as 21 this laboratory is concerned.
- Q. Okay. And in this particular one there is an indication of positive?
- 24 A. Yes.
- 25 | Q. Okay. The next page, what's this? It has the

- 1 same heading or the same --
- 2 A. Same sample description, same date and time.
- 3 These -- This is a different display of the same
- 4 electronic file. So all they are doing is going
- in and zooming in on part of the spectrum from
- 6 the previous page that -- in order to try to
- 7 decide and confirm the assignment. It's a normal
- 8 kind of a practice.
- 9 Q. And so this reference up here, zoom?
- 10 A. Yeah, parenthetically, the analyst went in there
- and noted that this is simply a zoom of that same
- 12 file.
- 13 Q. So this is a zoom page of the very same page
- 14 right before it?
- 15 A. That's correct.
- 16 | Q. All right. Two more blanks, and now we come to
- 17 something called Spot LOD, 1 microliter?
- 18 A. Yes.
- 19 Q. This has -- This is also called a positive?
- 20 A. This sample is called positive, yes.
- 21 Q. Okay. And the three ions that they seem to be
- looking for through all these tests are a 160, a
- 23 247, and a 132, and certain ratio to each other,
- 24 right?
- 25 A. I -- You know what, I would have to look those

- up, because I haven't been that familiar with it,
 but there are certain characteristic ions that
 are EDTA and it's not just the presence of those
 ions, but the relative ratios of those ions that
 matters to the interpretation.
 - Q. Well, let's just go back for a second to Mr -Mr. LeBeau's own blood and see the ions that are
 reported here that are showing up as detected,
 the one that he had crossed out and then put
 positive, just a couple pages back?
 - A. I must have missed it. Oh, okay.

- Q. Okay. And what are the ions that are being reported by the instrument in this?
- 14 A. There are -- There are three ions that are
 15 reported, 132, 160, 247, 293. There's actually
 16 four that are present in this sample.
- Q. And 160 is the one that's always expressed at the -- the highest is always up at the top?
 - A. Yeah, this -- if you look at that scale there, it goes from 0 to 100, on the left, no matter how much of the compound is present, it always sets that at 100 percent. That's essentially a percentage. And the highest peak is always set at 100 percent and everything else is measured in relation to that highest peak. Whether it's one

- inch tall or a foot tall, the highest peak is set
- 2 at 100 percent.
- 3 Q. And does that mean -- does that have any
- 4 indication about the quantity of the -- of the --
- 5 A. No.
- 6 Q. -- of the substance that they found?
- 7 A. No, it's simply that the most abundant peak that
- 8 we saw, the ion that was there with the highest
- 9 frequency, the most abundance, is set at 100. It
- 10 doesn't relate to the quantity at all.
- 11 Q. Okay. If we could flip back to where we were, at
- the Spot LOD, 1 microliter, a few pages later.
- 13 A. Okay.
- 14 | O. Start at 5:07:38 seconds?
- 15 A. Mm-hmm.
- 16 | Q. Okay. This one is marked as a positive, right?
- 17 A. Yes.
- 18 Q. Do you see any -- or what ions do you see
- 19 expressed in this?
- 20 A. It has three of the four that you saw in the
- 21 previous sample; it has 160, 247, and 293.
- 22 Q. All right. Now, what's the very next page?
- 23 A. A blank.
- 24 Q. No, before that, the zoom?
- 25 A. Oh, okay, sorry, I was looking at the zoom page.

- 1 Q. Oh, you were, okay.
- 2 A. Yeah. The first page has those three ions, the
- 3 second page, just like the previous example, is a
- 4 zoom of the same result.
- 5 Q. And even though it's a zoom, is there any --
- 6 there's still not a 132 ion showing, right?
- 7 A. That's correct.
- 8 Q. But it's marked as a positive?
- 9 A. That's correct.
- 10 Q. Okay. We're almost done, two more blanks. And
- 11 now we come to the second to the last page of
- this exhibit. This is February 16, 5:40 at 13
- 13 seconds, right?
- 14 A. Yes.
- 15 Q. It says Spot LOD, 2 microliters, at Q-49. By the
- way, just so we're clear, what does this tell
- 17 you, the way it's designated as Spot LOD?
- 18 A. It appears that the laboratory is trying to
- 19 decide a detection limit for a sample of blood
- 20 that's collected from the Q-49 file, that they
- 21 are actually trying to use the purple-topped tube
- 22 that was submitted in this case, and trying to
- 23 see whether or not I can see 1 -- I can see EDTA
- in a 1 microliter sample and whether or not I
- could see EDTA in a 2 microliter sample. So

- 1 they're actually trying to empirically determine
- whether they can even see EDTA when they know
- 3 that it's a sample from Mr. Avery's tube of
- 4 blood.
- 5 Q. And does this relate, then, to the sentence, the
- 6 remark in Mr. LeBeau's report, that,
- 7 specifically, EDTA is detectable when a 1
- 8 microliter drop is analyzed?
- 9 A. Yes. This is 2 microliters that's displaying on
- 10 the screen right now, but I would conclude, from
- 11 his report, that he is referring to when he ran a
- 12 1 microliter sample, he detected and identified
- 13 EDTA. And so that's the source of his statement
- in the report.
- 15 Q. That's the one we saw that shows three of the
- four ions, but is missing one of them?
- 17 A. Yes.
- 18 Q. Now this one, though, what's marked at the bottom
- of this page? Is there any call made on this
- 20 page?
- 21 A. Yeah, this is the 2 microliter sample, so they
- 22 are taking --
- 23 | Q. A bigger sample.
- 24 A. -- a tube of Mr. Avery's blood, and instead of
- just extracting a 1 microliter stain, they are

- taking a 2 microliter sample of his blood and
 taking it through the process. In this case,
 when they ran it through their process, they did
 not detect EDTA. This is a sample that they took
 from Mr. Avery's purple-topped tube, 2
 microliters, they did not detect EDTA.
 - Q. Well, on this particular page, his initials are there, but he doesn't appear to be making a call?
- 9 Α. Yeah, I can infer from that that as he was going 10 through these results, when he got -- he expected, probably, to see EDTA, because he had 11 12 seen it in the 1 microliter sample. And when he 13 got here, he probably said, oh, this doesn't meet 14 the criteria. This isn't passing. What's going 15 on. So if you go to the next page, he zoomed 16 in --
- Q. I will in just one second, but this one does show a 133 ion, a 160, and where are we?
- 19 A. You're making me dizzy.

- Q. I'm sorry. And a 247, which are three of the ones you were looking at before. Why wouldn't this -- Why isn't he making a call that it's present in this instance?
- A. I can only infer that, because he doesn't indicate that in any of his records, the basis

- for whether he made a call or not. However, this
- does not conform to the FBI Laboratory's own
- 3 rules for making a call, because I got a copy of
- 4 their procedure for mass spectral interpretation.
- 5 And this has an ion ratio problem. You may
- 6 recall that the 160 is usually the biggest peak
- 7 that relates to very characteristic ion.
- 8 Q. Right.
- 9 A. In this sample, 160 is not the biggest peak, that
- 10 -- this 293 is the --
- 11 Q. Over here.
- 12 A. -- is the large peak. Yeah.
- 13 0. Okay. So then --
- 14 A. It flaunts their own ion ratio rules for making
- 15 an assignment.
- 16 Q. Okay. So then what does he do then; what's the
- 17 very last page?
- 18 | A. On the very last page, he zoomed in to see if
- 19 there was any more information he could elicit
- 20 from doing a more detailed analysis.
- 21 | Q. And how can you tell this is a zoom of the very
- same results, other than obviously he's got it
- 23 | written there?
- 24 A. Again, it's because it's the same date and time.
- 25 So it's just processing exactly the same

- 1 electronic file, looking at the same data, just
- 2 zooming in on it.
- 3 Q. Okay.
- 4 A. Much like we can do when we zoom in on things on
- 5 a computer.
- 6 Q. And when he zooms in, does he get the same --
- 7 have the same issue, same problem?
- 8 A. Yes.
- 9 Q. Once again, 160 is not at the right ratio; so
- 10 then what does he call?
- 11 A. So he makes a call on this sample, this 2
- microliter sample, as not detecting any EDTA.
- 13 Q. All right. I'm -- Just so we're clear, there's
- one last page, and it's a blank?
- 15 A. That's correct.
- 16 Q. All right. So, in his report, then, when he says
- that EDTA is also detectable as low as a 1
- 18 microliter drop, his own data, does it support
- 19 that at all?
- 20 A. The problem is, he has data that indicates he can
- 21 | not detect EDTA in a 2 microliter drop. That
- 22 kind of a result is entirely consistent with the
- 23 | fact that his method has a hard time detecting it
- 24 at the concentrations in question here.
- 25 | It's an overstatement, if you will, to

- say it can be -- to say -- I want to get the
 exact words -- to say that it's detectable when a

 1 microliter drop of EDTA preserved blood is
 analyzed. That's an overstatement, because his
- own data shows that he can't detect it in a 2
- 6 microliter spot.
- Q. All right. Now, his data did -- or he does express the opinion that EDTA was detected in Q-49, the tube of Mr. Avery's blood, 11 year old tube, right?
- 11 A. Yes.
- Q. Is there any data that quantitates how much that EDTA is there?
- 14 A. None.
- Q. You mentioned before that, you know, a new,
 pristine, brand new blood tube sample, according
 to his own protocol, would be between a thousand
 and 2,000 parts per million, EDTA concentration,
 right?
- 20 A. Correct.
- Q. Is there any way to tell whether or not, after 11 years, the EDTA that would have been in

 Mr. Avery's purple-topped tube is -- has degraded down to even a barely detectable limit?
- 25 A. There certainly -- If they quantitated how much

EDTA was present; they did not do that. They 1 simply identified the fact that EDTA was present 2 3 in Mr. Avery's blood sample. They made no attempt to say how much EDTA was present. 4 Obviously, I don't know how much was present 11 5 year ago, but they could have looked in the 7 sample now to see how much was present in his blood today. But their method was not designed 8 to do that and was never validated to do that. 9

- Q. So when they find a positive result for EDTA in that Q-49 tube of Mr. Avery's blood, it could be a thousand parts per million or 50 parts per million?
- 14 A. We just have no way of knowing, no way at all of knowing.
- 16 Q. And is EDTA the kind of chemical that will degrade over time?

10

11

12

13

23

24

25

A. It's like any other chemical, it's dependent on the conditions that it's exposed to in a length of time. Chemicals, in general, are subject to degradation from things like light and temperature and biological activity.

I have not -- I don't know what the degradation curve is for EDTA, but in analytical chemistry, we put shelf lives on materials. And

the manufacturers who certify their reference materials and who certify their results, know how long that material is stable in that environment. So they assign a shelf life, much like the FBI did in their procedure. Their procedure for analysis of EDTA in bloodstains has requirements for preparation of EDTA solutions, and they impose a shelf life on them.

Say that their EDTA performance mix that has EDTA in water is stable for a period of at least six months, what that means is, when you get past six months they can't use it any more.

It's just like when milk is a week past it's expiration date, you shouldn't be drinking it.

- Q. And that's their own protocol imposes a six month limit on a solution that they mix up of known EDTA, right?
- 18 | A. Yes.

- 19 Q. Commercially purchased.
- A. Yes, of reagent grade EDTA, that's of known purity and we actually know its chemical composition.
 - Q. All right. If you would step over here, please, we have had some problems today and yesterday with Mr. Strang's computer being able to project.

THE COURT: Mr. Buting, can I ask how long
you think your direct is going to continue yet.

ATTORNEY BUTING: Just one moment. Not much more; we could probably finish in about five minutes I would think.

THE COURT: All right. You can have five minutes, go ahead.

ATTORNEY BUTING: Okay.

- Q. (By Attorney Buting)~ For some reason -- This is the videotape that we showed the jury a couple of days ago, and for some reason I'm not able to get it up there, but it is on the computer screen here. Do you see anything that looks like an expiration date on this particular tube?
- A. Yes.

- Q. Okay. You can retake your seat. And tell the jury what you see as an expiration date on this 11 year old tube of blood, Q-49, that is
 Mr. Avery's blood that was found in the Clerk's Office.
 - A. These tubes are routinely manufactured and provided by their manufacturer with expiration dates. In this case, it's March of '96.
 - Q. So when Mr. LeBeau tested this tube for the presence of EDTA in February of 2007, he was

- 1 testing it approximately -- almost 11 years
- beyond its expiration date?
- 3 A. That's correct.
- 4 Q. All right. Having reviewed all of this data,
- 5 then -- By the way, were you able to see
- 6 Mr. LeBeau's testimony, recorded?
- 7 A. Yes, the online streaming video, I was able to
- 8 see it there.
- 9 Q. Okay. And did you see the PowerPoint
- 10 presentation where he talked about his thought
- 11 process or the hypothesis he was considering?
- 12 A. Yes.
- 13 Q. And he mentioned only two, do you recall that?
- 14 A. Yes.
- 15 Q. Could you talk about that for a moment, what you
- 16 think about that?
- 17 A. Yeah, he, essentially, says that, when I get
- 18 results -- when I get results from the
- 19 laboratory, it either shows that EDTA is detected
- or not detected. Those are the only two options.
- I agree that those are the only two
- options that can come out of his protocol. It's
- either detected or it's not.
- 24 But then he draws the conclusion that in
- 25 the event that it's not detected, which is the

case here, in these stain samples, in the event that EDTA is not detected in the stain samples, he draws the conclusion that that means it must have come from active bleeding, rather than from Mr. Avery's tube. That's just simply not supported by the actual laboratory results in this case.

Q. And why not, is there some other conclusion?

- A. Yes, it certainly is quite plausible that the bloodstains that were swabbed from the RAV4 contained EDTA, but the lab simply was not able to detect it, as was the case in that 2 microliter sample of Mr. Avery's blood that they attempted to test and were not able to detect EDTA.
- Q. And, for the record, we have finally been able to display the still, frozen part of the video of the -- I don't know the exhibit number -- 1 -- 470, where the container contain -- the tube of blood was opened at the Clerk's Office. And do you have a laser pointer available? No, no laser pointer here today?

ATTORNEY KRATZ: Oh, I have one.

ATTORNEY BUTING: Oh, you do. Can I borrow it, please?

- ATTORNEY KRATZ: Sure, let me help you out.

 ATTORNEY BUTING: There you go. Thank you.
- Q. (By Attorney Buting)~ Could you point with the laser to what you were referring to when you were talking about expiration date.
- A. Okay. It's upside down here, so you have to see that it's upside down. It's right here, it says EXP March '96.
- 9 Q. So from this data -- Well, let me just make it
 10 clear for the jury, first of all. Were you able
 11 to actually test any of these samples in this
 12 case?
- 13 A. No.
- Q. All right. And when did you receive the materials that you have in front of you?
- 16 A. Late on Tuesday, this week.
- Q. Okay. But it refers to tests that were done just last week on March -- or February 26?
- 19 A. This is probably the fastest turn on any data I
 20 have ever reviewed.
- Q. What would be a more typical length of time for one to do a -- develop a brand new protocol and validate it and do all that?
- A. Development, validation, performance of the testing of unknown samples, is usually -- you

know, there's no set rules, but it's usually something that takes considerably longer than the very aggressive time frame in this case. In this case, they were actually running the case samples before they even had the results of their competency sample, so it was very, very compressed.

- Q. And, so, from this data, can you express any opinion about whether the 3, as Q-46, 47, and 48, questioned stains examined by Mr. LeBeau, could have come from the blood sample, the blood tube, Q-49, that was also examined?
 - A. It's quite consistent with the results that were presented by the laboratory. Because of their inability to detect EDTA in the 2 microliter sample of Mr. Avery's blood, it's quite possible that those blood swabs could have come from Mr. Avery's blood tube, but simply not been detectable by the laboratory.
 - Q. And what about the three swabs from the RAV that were not tested by Mr. LeBeau; can any conclusion be drawn on that?
 - A. I'm an analytical chemist, I'm not in the business of just guessing on some samples. We have to test samples to decide what's in them.

Q. Is there any kind of a -- We were talking about a limit of detection, and, you know, what the method can detect. And a lot of this is technical stuff for us lay people. Is there any kind of analogy that you can draw about, you know, some sort of instrument, or some sort of detection limit that we have?

A. You gave me the entree. This -- We have pretty good detection limits. Our noses are able to smell things. People are -- have different sensitivities to different smells. And that means we have different instrument detection limits, if you will.

Some of us can detect things that are present at very, very low levels. And some of us require that more of it be present before we can detect it. So our nose is analogous to an instrument, in terms of its ability to detect a smell.

- Q. So if one was blindfolded and given a -- say a warm apple pie or something, and asked, can you smell an apple pie, is that an example of your nose being able to detect something?
- A. Yeah. Yeah. And although I suspect that most of us who at least have well-functioning noses could

- detect a warm apple pie if there were no complications, if that apple pie was present in a room with a lot of other smells, or the doors and the windows were open and there was a brisk wind blowing through, you might not be able to detect it. Doesn't mean that the apple pie is not there, doesn't mean it's not giving off odor, it just means you can't detect it. So that's the difference between an instrument detection limit and a method detection limit.
- 11 Q. All right. And, finally, as a matter of
 12 scientific adequacy, can the protocol that
 13 Mr. LeBeau developed, I think it's 434, be used
 14 to rule out the presence of EDTA in those three
 15 RAV4 bloodstains that were tested, just because
 16 it's not detected in their tests?
- 17 A. No.

- 18 Q. And why not?
- A. Because we just don't know what the method
 detection limit of his method was, as evidenced
 by the fact that he couldn't detect a 2
 microliter sample of Mr. Avery's blood -- he
 couldn't detect EDTA in a 2 microliter sample of
 Mr. Avery's blood.
 - Q. So even having gone through this test, is it

1		possible that EDTA is, or was, in those 3 RAV4
2		stains?
3	Α.	Yes.
4	Q.	Thank you.
5		THE COURT: All right. At this time we'll
6		take our morning break. We'll resume in 15 minutes.
7		Members of the jury, I will remind you, again, not
8		to discuss this case, this morning's testimony, or
9		any other element about the case during the break.
10		(Jury not present.)
11		THE COURT: All right. Counsel, we'll
12		return in 15 minutes.
13		ATTORNEY BUTING: All right.
14		(Recess taken.)
15		(Jury Present.)
16		THE COURT: Mr. Gahn, will you be doing the
17		cross-examination for the State?
18		ATTORNEY GAHN: Yes, I will.
19		THE COURT: You may begin.
20		ATTORNEY GAHN: Good morning.
21		THE WITNESS: Good morning.
22		CROSS-EXAMINATION
		TTORNEY GAHN:
23	BY A	IIIORNEI GANN:
2324	BY A	

- 1 your experience, actual hands-on-experience with
 2 the LC/MS/MS technology?
- 3 A. I have operated liquid chromatographs and mass
- 4 spectrometers. I have not operated them
- 5 configured, essentially connected together in the
- 6 manner in which they were in this case.
- 7 Q. Okay. And -- And could you just describe the
- 8 difference in the way they were connected
- 9 together in this case and what you are familiar
- 10 with.
- 11 A. I'm not sure I understand your question. The
- physical difference between how they are
- interfaced or?
- 14 Q. No, if you, yourself, have not performed
- analysis, on chemicals, using the LC/MS/MS
- 16 technique?
- 17 A. That's correct.
- 18 Q. Have you ever performed any type of analysis to
- 19 test bloodstains for EDTA?
- 20 A. No.
- 21 | Q. Have you ever conducted any type of analysis to
- 22 detect blood EDTA levels in a lavender-topped
- 23 tube?
- 24 A. No.
- 25 Q. How about any type of blood collection tube?

A. No.

- Q. You talked about blood collection tubes and -- in reference to the expiration date; what is your experience with blood collection tubes?
 - A. Part of what I do when I assess data quality, if the sample was collected in any particular container, be it a blood collection tube or any other kind of container, part of what I'm doing is seeing whether that container was appropriate to protect the integrity of the sample, so that its composition was not altered or degraded over time to the extent possible by its interaction with the tube.

So whether it's in a quart jar, or a purple-topped tube, I'm looking at, did they know that that container was of appropriate cleanliness before the samples were put in, and that type of thing. And these things are typically purchased in lots. And they are certified for a particular lot. So that manufacturer has actually tested those samples, made sure that they met their specifications, and certify the lot.

If there's a problem, then they can go back and find out which lot caused the problem,

- just like they could find out which peanut butter
 had the problem and so forth. So it's a lot
 identification.
- Q. So, again, what is your personal experience on how a purple-topped tube works?
- A. My personal experience with how it works?

 Obviously, I have the same lay experience that

 everybody in the courtroom does with when I have

 had blood samples collected. My experience as a

 quality auditor is simply reconstructing the

 paper trail associated with the integrity of that

 sample.
- Q. Are you stating that the expiration date on that vacutainer applies to the stability of EDTA?
- 15 A. No, sir.

25

- 16 Q. What does the expiration date on the purple-topped tube, ma'am, apply to?
- 18 A. The expiration date is determined and assigned by
 19 the manufacturer. And it provides the user with
 20 a date beyond which they cannot certify the
 21 appropriateness of that tube for it's intended
 22 use; that is, protecting the integrity of that
 23 blood sample.

And that's a combination of all the things that go into that. It's the combination of

- 1 maintaining the integrity of the vacuum, the
- 2 EDTA. It's the package. They don't have
- 3 separate expiration dates.
- 4 Q. What can you point to that states that the
- 5 expiration date on the purple-topped tube
- 6 pertains to the stability of EDTA?
- 7 A. Nothing. It does not do that.
- 8 Q. All right. I just wanted to make that clear.
- 9 The expiration date has to do with the efficiency
- of the vacuum in the tube; isn't that true?
- 11 A. It's not just the vacuum; it's the entire package
- for its inappropriate use. They don't try to
- parcel out the parts.
- 14 Q. You are not stating that, because of that
- expiration date, the EDTA has broken down?
- 16 A. Oh, no, sir. No.
- 17 O. Thank you. That's all I needed.
- 18 A. Okay.
- 19 Q. I just wanted to clear that up. Mr. Buting put
- 20 up a number of exhibits that you looked at. And
- 21 one of the things I noted was that you only
- 22 looked at the results in what is concerned --
- 23 | called the positive ion mode; is that correct?
- 24 A. When he went through the page by page one?
- 25 O. Yes.

- A. This is the one on the 16th -- You know, I'm

 not -- I don't remember if this was positive or

 negative; I would have to go back and look at the

 sequence.
- 5 Q. Could you do that?

25

- A. Okay. No, sir, I believe it's the negative ion mode. Is there some misunderstanding of which data we're actually talking about?
- 9 Q. My understanding is that the data that Mr. Buting
 10 put up, for you to look at, was from the positive
 11 ion mode; isn't that correct? First of all, what
 12 is the positive ion mode?
- 13 A. It's just the operating mode for the instrument,
 14 whether you are looking at positive ions or
 15 negative ions.
- Q. And what does this look at for the EDTA? What is it looking for in the EDTA?
- A. In the course of the analysis, I believe you have probably already heard a brief introduction of this, a mixture is separated into its component pieces, or its component chemicals, with use of the chromatography instrument, used with the liquid chromatography.

And then as each set of chemicals comes out, or each package of chemicals comes out, is

- introduced in the mass spectrometer where it's

 frag -- it's subject to very high energy and it's

 fragmented. And when it breaks into pieces, the

 mass spectrometer then detects those
- Q. What I'm asking for is, in the positive ion mode,
 what form of EDTA are you looking at?
- 8 A. Well, I'm -- I'm not -- What am I looking at?
 9 It's -- In this case --

characteristic fragments.

- 10 Q. In this case, what did the FBI's Laboratory
 11 protocol, what form of the EDTA did it look at in
 12 the positive ion mode?
- 13 Α. It's -- It's actually, analytically, the sample 14 can contain EDTA in any number of forms. And so it can be present as a sodium salt. It can be 15 16 present -- During the course of extraction, it's 17 converted largely into -- During the course of 18 extraction and interaction with the blood calcium 19 in iron; is that what you are asking, whether 20 it's the ion form or --
- Q. I guess what I'm looking for is whether it's -what form and whether it's in its free acid form
 or in its comp -- metal or -- metal iron complex?
- 24 A. We can look for both.

5

25 Q. You can look for both?

- 1 A. Oh, sure.
- 2 | Q. Okay. And what I'm asking you is, what form did
- 3 the FBI look for in the positive ion mode?
- 4 A. Oh, I don't know. I would have to -- I believe
- it was the free acid, but I would have to look.
- 6 If that's what --
- 7 Q. You don't have to, I will agree with you.
- 8 A. Okay.
- 9 Q. Maybe we can come to some agreements here --
- 10 A. Okay.
- 11 | Q. -- and it will be easier for the jury.
- 12 A. Okay.
- 13 Q. And in the negative ion mode, is it fair to say
- they were looking for the forms of EDTA, not only
- in free acid form, but also in the metal iron
- 16 complex?
- 17 A. That's correct.
- 18 Q. Okay.
- 19 A. That's correct.
- 20 Q. Now, back to my original question.
- 21 A. Okay.
- 22 Q. The data that you looked at and you showed up on
- 23 the big screen, wasn't that only from the
- 24 positive ion mode; only -- in other words, only
- in its free acid form?

- 1 A. Yes, you are targeting, specifically, the ions
- 2 attributable to that -- from that one breakdown,
- 3 yes.
- 4 Q. So no data in the negative ion mode was shown on
- 5 the big screen, correct?
- 6 A. I don't remember, but there's some in the
- 7 package, if that's your question.
- 8 Q. That's my question. Did you display, or did
- 9 Mr. Buting display, any of the data in the
- 10 negative ion mode, which would be in the free
- acid and in the iron complex forms?
- 12 A. I don't remember if he did.
- 13 Q. Well, let me ask you this, then, ma'am.
- 14 A. Okay.
- 15 Q. Do you remember reviewing that data?
- 16 A. Yeah.
- 17 | O. And what did -- What did the data tell you in the
- 18 negative ion mode?
- 19 A. Well, it's -- it's quite clear that -- I don't
- 20 know what you mean, which data you are talking
- about, but it's quite clear that the method is
- 22 capable of detecting EDTA and -- and its iron
- 23 complex, as I would expect to be the case.
- 24 Q. So the protocol that the FBI put together is
- capable of making an analysis for the presence of

- 1 EDTA in a lavender-topped tube, correct?
- 2 A. Yes, that's correct.
- 3 Q. And, likewise, in a non-preserved tube?
- 4 | A. Yes.
- 5 Q. And, likewise, in dried bloodstains?
- 6 A. Yes.
- 7 Q. Now, did you read any articles or publications
- 8 that had to do with the analysis of EDTA in dried
- 9 bloodstains?
- 10 A. Only those articles that were provided by the FBI
- 11 Laboratory as part of their foundational
- 12 reference material along with this case.
- 13 Q. I'm going to ask that Mr. Fallon hand you two
- exhibits. And I would ask you to identify each
- of them for us, please.
- 16 A. Yes, sir. Exhibit 436 is an article from the
- Journal of Analytical Toxicology, The Analysis of
- 18 | EDTA -- sorry, I'm going too fast -- in Dried
- 19 Bloodstains by Electrospray LC-MS-MS and Ion
- 20 Chromatography.
- 21 | Q. Let's stick with that one just for a minute.
- 22 A. Okay.
- 23 Q. Did you read that?
- 24 A. Yes.
- 25 | Q. And is analytical -- I'm sorry, was that

- 1 Analytical Chemistry or Toxicology?
- 2 A. This particular one is Analytical Toxicology.
- 3 Q. And the Journal of Analytical Toxicology, is that
- 4 a well recognized scientific publication?
- 5 A. Yes, it is.
- 6 Q. And it's scholarly authoritative in the field?
- 7 A. Yes.
- 8 Q. And an article such as this would be a peer
- 9 reviewed article?
- 10 A. Yes.
- 11 Q. And that article also determined that it's
- possible to test for the presence of EDTA in
- dried bloodstains?
- 14 A. That's correct.
- 15 Q. And, also, the article, which would be the next
- exhibit, please, could you state where that was.
- 17 A. That's an article from The Analytical Chemistry,
- Exhibit 437, dated August 1st, 1997.
- 19 Q. And that, also, is a scholarly, authoritative,
- 20 scientific publication?
- 21 A. Analytical Chemistry is, yes.
- 22 Q. How about Analytical Toxi -- I'm sorry --
- 23 Analytical Chemistry?
- 24 A. Yes.
- 25 Q. And, again, that would be a peer reviewed

- 1 article.
- 2 A. I presume so.
- 3 Q. And, again --
- A. This is a web version. I don't -- I don't know if this was one of the ones subject to the same
- 6 peer review, but I would presume so.
- Q. And did you -- When you read the FBI protocol and compared it to those two articles, did you note any improvements that the FBI made in the development of the protocol that was used in this case?
- 12 A. Yeah, I would presume that there were several
 13 things that they did that would have to be
 14 considered improvements against these early
 15 versions.
- 16 Q. And could you tell us what those improvements
 17 were that they made?
- 18 Α. Their extraction procedure is substantially 19 different. One of these techniques uses 20 capillary electrophoresis instead of liquid 21 chromatography. They each have their own issues. 22 They are using tandem mass spec, mass spec, mass 23 spec, in the FBI's method. And the extraction 24 procedures are substantially different. I would 25 have to presume that those -- that they did those

- 1 because they considered it to be an improvement.
- 2 Q. Do you believe it was an improvement, by doing
- 3 the analysis, looking for not only the free acid
- form and also the iron complex form of EDTA?
- 5 A. That would be considered a benefit.
- 6 Q. Correct.
- 7 A. Yeah.
- 8 Q. And why would that be a benefit? Why would you
- 9 want to look for it in the negative ion mode in
- 10 both forms?
- 11 A. Well, because it's a better -- essentially, if
- 12 you will, a better recovery, better understanding
- the path that EDTA took in your samples.
- 14 Q. So there were significant improvements made in
- this current protocol over the two articles that
- 16 you --
- 17 A. Oh, certainly, yes. Science isn't static, we
- 18 hope to improve it all the time.
- 19 Q. All right. Thank you. With that, significant
- improvements, I do note from your direct exam
- 21 that you had a little problem with the -- I
- 22 quess, what, the uncertainty of their measurement
- 23 system, or their -- that -- their detection
- 24 level?
- 25 A. Detection limit -- method detection limit, that's

- 1 correct.
- Q. What is the difference between a qualitative assay and a quantitative assay?
- A. That's a very good question. A qualitative assay
 or qualitative measurement doesn't tell you how
 much of something is present; it simply detects
 it and identifies it. So, qualitatively, I can
 say that EDTA is present, but it says nothing
 about how much EDTA is present.

In contrast, a quantitative assay tells
you how much of something is present. There is
an entirely different calibration protocol to get
to how much of a given compound is present.

- 14 Q. And both are scientifically sound procedures?
- 15 A. Absolutely.

10

11

12

- Q. And how would you characterize the FBI's protocol or testing methodology in this case?
- 18 A. This is a purely qualitative method.
- Q. And that, again, is a valid scientific method of developing an analysis methodology?
- 21 A. Absolutely.
- Q. Now, if you would please pick up the -- their protocol, please. Do you have that?
- 24 | A. The FBI's protocol?
- 25 Q. Yes, please.

- 1 A. Yeah. Yes. Okay.
- 2 Q. And on Page 7, under Paragraph 14, Limitations,
- No. 8, the Limit of Detection, is it -- it was
- 4 your testimony that this was under a valid method
- 5 for determining their limits of detection?
- 6 A. It's not a universally used method, but it's an
- 7 appropriate means of getting to an instrument
- 8 detection limit.
- 9 Q. And one that could be used in detecting the
- 10 levels of EDTA, whether in a purple-topped tube
- or in a dried bloodstain?
- 12 A. No, the method that they used, that they referred
- to in this paragraph, is simply a means of
- 14 determining an instrument detection limit. So
- it's -- it detects how much -- it gives you an
- indication of how much EDTA you can detect from a
- 17 solution that you actually take a syringe and
- 18 inject into the instrument. It doesn't tell you
- 19 anything about how much EDTA you can detect from
- 20 a stain sample.
- 21 | Q. But this limitations in their protocol clearly
- 22 state, and the data shows, that they are able to
- 23 detect -- 1 microliter drop is readily detectable
- in this protocol?
- 25 A. I don't believe that that's true.

- Q. So when they state that the 1 microliter drop was readily detectable using this technique, are you saying that's not true?
- That particular statement is in reference to this 4 Α. 5 paragraph about a separate LOD study where some EDTA was placed into a lavender-topped tube. That's not what I'm referring to when I say they 7 had problems detecting it in a 2 microliter spot. 8 9 I'm referring to the actual case samples in this 10 case, where they -- where they were not able to detect it from a 2 microliter set of blood, of 11 12 Mr. Avery's blood, as opposed to this one, which 13 is a more sort of theoretical, pristine case.
- Q. I think we're talking about the same thing, but maybe my question was not very good.
- 16 A. Okay.

18

19

20

21

22

23

24

- Q. The system that they developed, the methodology that they developed, allows them to detect levels of EDTA to the 1 microliter level?
 - A. Okay. The reason that's not a true statement, generally, is because we don't know how -- the concentration of EDTA that's present in that microliter. I don't know if there's 100 micrograms or 1 microgram present in that 1 microliter sample.

So saying it's possible to detect EDTA in 1 microliter of blood really, scientifically, doesn't mean much unless you also know the concentration of EDTA. In this case, they state that the 1 microliter drop that they prepared from -- from a whole blood sample and known EDTA, they knew the concentration of EDTA in that sample.

I was unable to find the data related to this particular experiment that they described.

It wasn't in this package, as far as I could tell.

- Q. And that would be important in a quantitative aspect?
- A. It is absolutely important in a quantitative assay, but it's -- the reason it's important qualitatively is because when you say not detected, it's not detected at what level. Is it not detected at a very, very concentrated level, or is it not detected at a very, very weak level?

If I have my glass of water here and I drop in two drop -- two crystals of sugar, there is sugar in my water. But I may or may not be able to detect it. If I run it by some techniques, I may say not detected. It doesn't

- mean it's not there, it just means I can't detect

 it.
- 3 (Court reporter asked the witness to slow down.)
- 4 I'm sorry. If I run it by a method with a very Α. 5 high detection limit, I won't be able to detect -- find the sugar. It doesn't mean it's not there; it just means that I can't find it. If I 7 put a lot of sugar in there, that method might be 8 9 able to detect it. And I would say, yes, I saw 10 sugar in that water. So it really depends on how 11 much sugar is in my water sample, or how much
 - Q. When you looked at the data, did the testing procedures employed by the FBI detect, at the 1 microliter level, EDTA in the blood tube of Steven Avery?

EDTA is in the blood sample.

- A. In the 1 microliter sample that they reported, a single instance, yes, they did report a positive for EDTA. The 2 microliter sample, they did not detect EDTA.
- Q. But, again, that was just looking in the positive ion mode, just --
- 23 A. Yes, that was the same set, yes.
- 24 | O. Just the free acid form?
- 25 A. Yes.

12

13

14

15

- Q. Did you look at the negative ion form in the more sensitive testing?
- 3 A. I believe that by the FBI's own data, they
- 4 indicate that both methods are comparably
- 5 sensitive. They report the same detection --
- 6 instrument detection limit for both. Let me look
- 7 and see if I can find some negative here. Okay.
- 8 I'm not sure this is your question, so tell me if
- 9 I'm off track here.
- 10 Q. Would it be helpful if I were to put up, on the
- 11 big screen, the 1 microliter results from the
- tube of Avery -- tube of Steven Avery's blood?
- 13 A. I completely concur that that shows the positive
- 14 detection and identification of EDTA.
- 15 Q. And what I'm saying, though, ma'am, is that, what
- 16 you put up during direct exam was just in the
- positive ion mode. I would like to put it up in
- 18 the negative ion mode --
- 19 A. Okay.
- 20 Q. -- also.
- 21 A. Okay. Okay.
- 22 Q. Would that be helpful for you instead of trying
- 23 to --
- 24 A. Well --
- 25 Q. I will directly go to it.

- 1 A. Okay. Thank you.
- 2 Q. And could you look -- does this state that these
- are the test results, in the negative ion mode,
- 4 for the 1 microliter?
- 5 A. Yeah. I don't know where that is in my package
- 6 but, yes, that's what that looks like.
- 7 Q. Okay. But you did see this and review this?
- 8 A. Oh, yeah. There's a lot of stuff here.
- 9 Q. And EDTA is clearly present in the negative ion
- 10 mode. This is in the acid free, as well as the
- iron complex, in the tube of Steven Avery's
- 12 blood, at the 1 microliter level, right?
- 13 A. The way that the laboratory runs their protocol,
- their screening and confirmation, and they,
- essentially, have to have confirmation both ways.
- 16 They have to have a positive in both techniques.
- 17 That's why, frankly, once I saw that it
- 18 | was not detected, I didn't spend a lot of time
- 19 | looking at the rest of it, but I will try to find
- 20 this, if that's okay.
- 21 Q. Or if we zoomed out more --
- 22 A. I don't see the analysts call on here, so to see
- 23 the criteria that they used. Okay. Thank you.
- 24 That helps.
- 25 | Q. We can set this up anyway you like. We're

- 1 just -- And look through the files, if you want.
- 2 If this is helpful, we can move on. Can you work
- 3 with this?
- 4 A. That's just fine, yeah.
- 5 Q. Does this show that EDTA is present in the vial
- of Steven Avery's blood, at the 1 microliter
- 7 level?
- 8 A. No, it doesn't, because there's inconsistent
- 9 results for that conclusion from the other
- 10 technique. You know, when you do it practicing
- analytical chemistry, you don't get to cherry
- 12 pick which results you want to accept or not when
- you run a given sample through an instrument.
- 14 0. What is it about the data, that is on this form
- in front of you, that states that EDTA is not in
- 16 Steven Avery's tube?
- 17 A. Nothing.
- 18 | O. Nothing?
- 19 A. Nothing.
- 20 Q. Okay. So, I will ask again, at the 1 microliter
- 21 level, in the negative ion mode, looking at free
- acid form, as well as iron metal complex form,
- 23 | EDTA is present in the tube of Steven Avery's
- 24 blood at the 1 microliter level?
- 25 A. As called here, that is a correct statement.

- 1 Q. Thank you.
- 2 A. Sorry.
- 3 Q. That's fine. Also, do you remember looking at
- 4 the data at the 2 microliter level?
- 5 A. Yes.
- 6 Q. In the negative ion mode?
- 7 A. No, I don't. I don't remember that. I'll bet
- 8 you can put it up there for me.
- 9 Q. I bet I can. Would you like to look at that,
- 10 too?
- 11 A. Please.
- 12 Q. And, again, what I'm going to ask is that whether
- in the negative ion mode, looking at the free
- acid form and the metal complex -- iron complex,
- that EDTA is present at the 2 microliter level?
- 16 | A. It appears that the analyst has called it a no in
- this case. You know what, I'm sorry, can I get
- 18 you to zoom in a little more --
- 19 0. Sure.
- 20 A. --right up here.
- 21 O. Mm-hmm.
- 22 A. I'm sorry. Okay. Yeah, it appears that the
- 23 analyst in this case has -- has called this a no.
- 24 And if you go back to the kind of left side where
- 25 he's -- the left side of the page --

ATTORNEY BUTING: Zoom out.

- A. Yeah, be easier if you back up a little. Down
 lower. There we go. Clearly, in this case -actually, if you go a little bit down, it will be
 more obvious that there is really nothing showing
 there.
 - Yeah, in this particular case, on this 247 ion, there's an indication that they simply did not detect it. And the analyst in this case is speculating as to whether that possibly may have been a weak injection.
 - Q. Correct. But at the 1 microliter level, in the negative ion mode, which we saw before, EDTA is in the blood tube of Steven Avery?
 - A. Based solely on that data, yes.
- Q. Now, when you -- And, clearly, whether you are in the positive ion mode or the negative ion mode,

 EDTA is present in the 5 microliter sample of

 Steven Avery's blood in the tube, correct?
 - A. I don't recall ever seeing data from a 5 microliter sample of Mr. Avery's blood. I only recall seeing one, two, and the actual lead sample.
- 24 (Court reporter couldn't hear.)
- 25 A. And the actual sample of Mr. Avery's blood. I

- 1 recall seeing a 1 and 2 microliter spot sample
- and what they called the positive control from
- 3 the Q sample.
- 4 Q. But this morning or late -- earlier this morning,
- 5 Mr. Buting put up the Positive Control B.
- 6 A. Yes.
- 7 Q. Which you --
- 8 A. Yes.
- 9 Q. And you recognize that that's the 5 microliter
- 10 level -- that's the 5 microliter level from his
- 11 EDTA tube?
- 12 A. Oh, I see. I see what you are saying, I think.
- 13 That particular sample, I have no way of knowing
- 14 exactly how much sample they used. That --
- Because the sole identification of that is
- 16 Positive Control, Q-49.
- 17 Q. But, ma'am, in their notes -- don't they clearly
- 18 state, in their handwritten notes, that for the
- 19 Positive Control B, 5 microliters?
- 20 A. All these samples have a 5 microliter injection
- volume. That's just how much of the sample is
- injected to the instrument, but it's not how much
- 23 of the blood sample is injected in the instrument
- in that case. It's how much of the extract
- volume is injected into the instrument. Those

- are two completely different things, with completely different concentrations.
- Q. Are you stating that the Positive Control B, Q-49
- 4 extract, is not the 5 microliter level of Steven
- 5 Avery's blood from the tube?
- 6 A. I -- As I understood it, that was a prepared
- 7 extract sample so -- and there's -- I will just
- 8 mention there's -- there are very few words in
- 9 this document. I can only infer from sample
- 10 description, sample titles.
- 11 Q. Would you look at the handwritten notes --
- 12 A. On the one that's been admitted previously?
- 13 Q. No, it might be easier if I were to bring you
- 14 what I have.
- 15 A. Okay.
- 16 Q. Instead of -- And I recognize that this -- such a
- large volume, is difficult for you to go through.
- 18 | We'll put it on the screen and, then, if you feel
- 19 as though you want to look through your notes to
- 20 find that section.
- 21 A. Okay.
- 22 Q. And do you see where it says Positive Control B,
- 23 | it's probably the third little hash mark down
- 24 from the notes, Positive Control, 5 microliters?
- 25 A. Can you zoom in on that, please?

- 1 | Q. Sure.
- 2 A. Okay.
- 3 Q. Do you see that?
- 4 A. Uh-huh.

- Q. So, when you put up this morning, the positive ion mode for the examination of the analysis, of this positive control, that showed that EDTA was present in the tube of Steven Avery, this was at the 5 microliter level?
 - A. I'm sorry, but that's a misunderstanding. If you continue to read here, it says 5 microliters of blood was pipetted onto a clean cotton swab. So he was not just taking 5 microliters and injecting it into the instrument.

He was taking 5 microliters and putting it onto a swab. And, ultimately, then it gets into the instrument. Now, that's analogous to if -- I'm not sure I'm understanding you properly -- but that is just analogous to the sample that I had concerns about, the 2 microliter sample. It's directly analogous to that, in terms of it wasn't directly injected into the instrument; it was placed on a swab and then that was extracted.

Q. Will you agree that the Positive Control B, Q-49,

- 1 the tube of Steven Avery's blood --
- 2 A. Mm-hmm.
- 3 Q. -- that at -- that in the data that you looked
- at, at the 5 microliter level, EDTA was present?
- 5 A. Yes, sir, it was.
- 6 Q. Okay.
- 7 A. I'm sorry, I thought that was like very clear.
- 8 Q. My questions may be inarticulate. I don't know.
- 9 A. I want to make sure I answer the right one.
- 10 Q. And you did. Okay.
- 11 A. Okay.
- 12 Q. All right. So, now, when you are talking 1
- microliter, 2 microliters, 5 microliters, it's an
- 14 awfully small amount.
- 15 A. It sure is.
- 16 Q. And I think you said on direct exam that
- sometimes, you know, you get down and there can
- 18 be things that can cause -- when you are down
- 19 that low in your detection levels, whether 1 or 2
- 20 microliter, something can skew one, one way or
- 21 the other; is that what you said or --
- 22 A. Well, it's just that, when you are down that low,
- 23 | it's a more complicated analysis. And there is
- 24 more variability, if you will, in the results.
- 25 If the sample concentration isn't homogeneous,

- any number of things can cause differences.
- 2 Q. But the data that we have just put up, as far as
- 3 the 1 microliter of Steven Avery's blood -- And
- 4 when we're talking 1 microliter, it's about like
- 5 1/50th of a drop, correct?
- 6 A. Right. And it's only a very small fraction of a
- 7 drop. If you look at this little pipette, it
- 8 would be obvious how small it is.
- 9 Q. And that's a very small amount we're dealing
- 10 with?
- 11 A. Yes, it sure is.
- 12 Q. And down to that level, EDTA was detected in the
- 13 blood of Steven Avery?
- 14 A. In the one not in the two.
- 15 Q. Pardon me?
- 16 A. In the 1 microliter sample, not in the 2
- 17 microliter sample.
- 18 | O. But also in the 5 microliter?
- 19 A. And in the 5, that they call the Positive
- 20 Control, that's correct.
- 21 | Q. And some artifact, or some interference, or
- 22 whatever, may have caused the 2 microliter level
- 23 to -- under their protocol, to not call it?
- 24 A. Sure. And that's -- that's why you do detection
- 25 limit studies, because detecting it sometimes and

- 1 not detecting it other times, is entirely the
- 2 kind of thing you expect if you are operating at
- 3 the detection limit.
- 4 | 0. It's not unusual?
- 5 A. That's not unusual.
- 6 Q. And even at the 2 microliter level, the presence
- of EDTA was indicated, but wasn't called, maybe
- 8 because the ratio with one of the other ions was
- 9 out of place, that's all?
- 10 A. Well, you know, in analytical chemistry, close
- 11 doesn't count. You either call it or you don't.
- 12 Q. Correct, and they didn't call it?
- 13 A. That's correct, they did not.
- 14 Q. But still, when you looked at the data, at the 2
- microliter level, the presence of EDTA still was
- 16 indicated?
- 17 A. That's correct.
- 18 Q. Okay. Now, maybe we don't even have to go
- 19 through the graphs. When you looked at the
- 20 extract, Q-46, which was -- under Q-46, do you
- 21 know which one I'm talking about?
- 22 A. Mm-hmm.
- 23 | Q. When you looked at the data in the positive ion
- 24 mode and the negative ion mode, correct?
- 25 A. Okay.

- 1 Q. No EDTA was detected?
- 2 A. I will look just to make sure, but that's my
- 3 recollection.
- 4 Q. Okay.
- 5 A. That's correct.
- 6 | Q. And in -- And that Q-46, as you know, is a
- 7 bloodstain from the dashboard of the RAV4?
- 8 A. That's correct.
- 9 Q. And on Q-47 extract, which was the bloodstain
- 10 from the rear passenger door of the RAV4?
- 11 A. Yes.
- 12 | O. No EDTA was detected?
- 13 A. That's correct.
- 14 Q. And on Q-48, which was a bloodstain from the CD
- case that was in Teresa Halbach's RAV4, in the
- 16 positive ion mode, as well as in the negative ion
- mode, no EDTA was detected?
- 18 A. Correct.
- 19 Q. I'm going to show you a picture of the swabs.
- 20 Have you seen the photographs of the swabs that
- 21 were --
- 22 | A. Xerox copies, I haven't seen the photographs
- 23 themselves.
- 24 Q. Would those be helpful, to see the photographs of
- 25 them?

- 1 | A. I can.
- Q. Okay. I want to show you, this was a -- where --
- 3 this would be Q-46. This would be where the swab
- 4 was taken from by the Crime Lab analyst.
- 5 A. Mm-hmm.
- 6 Q. And I would like to show you, now, a photograph
- of the swab, Q-46, that was sent to the FBI for
- 8 testing in this case. Now, again, we're dealing
- 9 with 1 microliter, which is, I think we agreed,
- 10 1/50th of a drop.
- 11 A. Okay. Here's the problem, we don't know what
- volume we're dealing with. After -- You know, we
- don't know what volume of blood was deposited on
- the dashboard, if you are referring to this
- 15 particular -- these photographs?
- 16 O. Yes, ma'am. I understand.
- 17 A. You said -- Okay.
- 18 | Q. What I'm stating is that the detection limit for
- 19 the FBI protocol was they can detect the presence
- of EDTA at the 1 microliter level. Isn't that
- 21 what the study stated?
- 22 A. It stated that. I don't believe the data support
- 23 that conclusion.
- 24 Q. But you just stated that there was no EDTA
- 25 present in the extract, Q-46, from the dashboard?

- 1 A. True, but you can't run a detection limit study
- on unknown samples. That's an unknown sample.
- 3 We don't know whether EDTA is present in that
- 4 sample or not. You can only run detection on a
- 5 set of unknowns.
- 6 Q. And there was no EDTA detected on the rear door
- 7 of Q-47?
- 8 A. That's correct.
- 9 Q. And there was no EDTA detected on the stain from
- 10 the CD case in Teresa Halbach's car?
- 11 A. That's correct.
- 12 Q. Yet, in the blood tube of Steven Avery, clearly,
- in the 1 microliter level, in the positive mode
- and negative ion mode, testing for free acid EDTA
- and metal iron complex EDTA, it was present?
- 16 A. It was present and confirmed in the 1 microliter
- 17 sample.
- 18 Q. Thank you.
- 19 ATTORNEY GAHN: Thank you, so much. That's
- all I have, ma'am.
- 21 THE COURT: Any redirect, Mr. Buting?
- 22 ATTORNEY BUTING: Yes.
- 23 REDIRECT EXAMINATION
- 24 BY ATTORNEY BUTING:
- 25 Q. Let's just -- Let's pick up right there for a

moment. Mr. Gahn was limiting, very carefully, his question to the 1 microliter level. But as we have shown and discussed here, both direct and cross, the data that the FBI -- the only data they generated shows different results when you test an even larger stain at 2 microliter, in the positive mode, right?

8 A. That's correct.

- Q. To an analytical chemist, what does it mean, then, when you get what appears to the layperson to be inconsistent results?
- A. I can certainly see how it seems inconsistent, but just based on my experience with detection limit studies, is that that's not an unexpected result if you are trying to analyze samples that are at or near the detection limit. The fact that sometimes you will see them and sometimes you won't, even at slightly higher concentrations, is not an unexpected result.
- Q. But does it allow you to draw the conclusion that Mr. LeBeau did in his report that, therefore, this protocol is detectable, or shows that EDTA can be detectable as low as 1 microliter?
- 24 A. I believe that's not supported by the data.
- 25 Q. Let me go back to the beginning of Mr. Gahn's

- 1 questioning for a minute, because I want to make
- 2 sure that it's clear to the jury, he asked for
- your opinion about whether or not this protocol
- 4 was sufficient to test for the presence of EDTA,
- 5 correct?
- 6 A. Correct.
- 7 Q. And you agreed that it is?
- 8 A. It is. If it detects EDTA, it's a reasonable
- 9 conclusion that it is present.
- 10 Q. Okay. Is the protocol also, however, adequate,
- or not adequate, to establish the absence of
- 12 EDTA?
- 13 A. It is insufficient to establish the absence of
- 14 EDTA at or near its detection limit.
- 15 Q. All right. So you can use this protocol in one
- 16 way, but you can also incorrectly use it in
- 17 another way?
- 18 | A. Yes.
- 19 Q. And in this -- Dr. LeBeau's attempt to use this
- 20 protocol, to exclude the presence of EDTA in the
- 21 | bloodstains; is that a correct or incorrect way
- of using this protocol?
- 23 A. I believe that's incorrect.
- 24 Q. The questions about the expiration date, for a
- 25 moment, on the tube, you indicated the

- 1 manufacturer's expiration date is for the whole
- 2 package?
- 3 A. That's correct.
- 4 O. Part of which is EDTA, right?
- 5 A. Yup.
- 6 Q. And the -- As far as the stability of EDTA and
- 7 its -- how long it lasts without beginning to
- 8 degrade, does the FBI's own protocol establish
- 9 only a six month limit for a known reagent
- 10 quantity EDTA solution that they prepared?
- 11 A. That's correct.
- 12 | Q. And in so doing, does that limit, in their
- protocol, express a -- I guess an opinion about
- 14 the stability of EDTA in that solution?
- 15 ATTORNEY GAHN: Objection, your Honor,
- 16 foundation for that question.
- 17 THE COURT: Sustained.
- 18 | Q. (By Attorney Buting)~ Is the fact that the FBI
- 19 themselves, when they make up a -- mix up a
- 20 solution of EDTA, in their protocol, the fact
- 21 | that they limit its use to only -- or
- 22 approximately six months, is that an indication
- 23 then of -- is that a shelf life?
- 24 A. That is, effectively, a shelf life.
- 25 Q. And is that -- Similarly, is that similar to the

- kind of shelf life that manufacturers put on
 products?
- A. Yes. You use it after the shelf life at your own risk. It may or may not be what they put into it.
- Q. Okay. Let me just -- Let me just clear up a
 little bit the whole idea of detection limit.

 When you get down to a detection limit for a
 sample, does that mean that at that limit you are
 lo percent of the time able to find what you
 expect to find?
- 12 A. No, it does not. It means that 50 percent of the
 13 time you will be able to see it and the rest of
 14 the time you won't.
 - Q. Really? So it's an equilibrium sort of, I mean, a null, or what would you call that?

16

- 17 I wouldn't really call it equilibrium because Α. 18 that means something pretty different. 19 it's -- it's like you are trying to see whether 20 or not there is one spike growing out of a field 21 of grass. There is a lot of variability, and you 22 are trying to see if one of them is big enough 23 than the rest -- bigger than the rest of them, 24 enough that you can detect it.
 - Q. And what you are saying is when someone -- when a

- chemist establishes a limit, a lower limit of detectability, whatever that level is that's found, even there, 50 percent of the time the substance may be present and not detected?
- 5 A. At that concentration, yes.

- Q. And the other 50 percent of the time it would be detected?
- A. Yes. When you get about an order of magnitude above a detection limit, that's the point where you can start to quantitate. You have to be higher than detection limit to be able to quantitate.

At a detection limit, you can only tell you whether or not it's there. You can't tell how much is there. In order to be able to tell how much is there, to actually get a quantitative analysis, you have to be substantially above the detection limit -- the instrument detection limit.

- Q. And you mentioned, early on in the direct, about some experience that you had and -- with the Navy, trying to examine the limits of detection that a particular protocol actually is designed to do, right?
- A. Mm-hmm.

- 1 Q. You have to say yes or no, I'm sorry.
- 2 A. Yes, sorry.
- Q. And in that instance you -- I believe you said
- 4 you found that even though the lab was reporting
- 5 that this -- to the Navy, that this chemical in
- 6 the bay was not present, by reviewing the same
- 7 kind of data you are seeing now, you were able to
- 8 determine that that was a worthless opinion
- 9 because the level was simply too high?
- 10 A. Yeah. It was meaningless in that particular
- 11 application. It's not -- It wasn't exactly the
- same kind of data. It wasn't LC/MS data, it was
- actually a different instrumental technique.
- 14 Q. Okay. I don't want to confuse things then. So,
- finally, then, when Mr. Gahn asked you, based on
- this test and this data, whether or not EDTA was
- 17 detected in 0-47 -- 0-46, 0-47 and 0-48, does
- 18 that mean that none of those samples have EDTA in
- 19 them?
- 20 A. Not necessarily.
- 21 | Q. Because of what you talked to us before about
- 22 detection limit?
- 23 | A. Yes.
- 24 Q. So, can you conclude then, that any of the RAV4
- 25 -- 3 RAV4 stains that were examined by the FBI

- could not have come from the blood tube that contained Mr. Avery's blood?

 A. I can't conclude that.
- Q. Based upon the data that's presented there, generated from the FBI's own tests?
- 6 A. Right.
- 7 ATTORNEY BUTING: Thank you.
- THE COURT: Anything else, Mr. Gahn?
- 9 ATTORNEY GAHN: Just a few follow-up
- 10 questions.

11 RECROSS-EXAMINATION

- 12 BY ATTORNEY GAHN:
- Q. Again, back to this tube, and the vacutainer tube, and the expiration date.
- 15 A. Okay.
- Q. You are not stating that, in March of 1999, EDTA broke down and was not present in that vial?
- A. No. In March of '96, when it hit its expiration date, it doesn't suddenly go bad on April Fool's Day. Just like milk doesn't suddenly go bad on its expiration date. But that's as far as the manufacturer can certify to its acceptability.
- Q. But doesn't that expiration date really have to
 do with the vacuum and they can't guarantee that
 the vacuum of bringing the blood from the vein

- into the tube is going to operate? 1 2 That's a serious limiting factor for those tubes, Α. 3 yes, absolutely. 4 And that's what they are stating by that Ο. 5 expiration date, correct? You know, it sounds subtle, but really it is the 6 Α. 7 system for its intended use. If you go back and 8 you look in the manufacturer's specs for these 9 things, that's the way they describe them. They 10 always talk about intended use. But probably most noteworthy in this case is that 11 Q. 12 the blood is still in its liquid form 11 years 13 later? 14 It is. Α. 15 And that means that the anticoagulant is working Q. 16 very efficiently? 17 That's correct. Α. 18 Ο. And that's due to the EDTA in the tube? 19 That's correct. Α. 20 ATTORNEY GAHN: Thank you, ma'am. that's all I have. 21 22 THE WITNESS: Thank you.
- 25 FURTHER REDIRECT EXAMINATION

follow-ups.

23

24

ATTORNEY BUTING: A real couple quick

1 BY ATTORNEY BUTING:

- Q. If the tube, Q-49, that Mr. Avery has, says it's
- 3 got EDTA in it, on the label, right?
- 4 A. Yes. Well, it doesn't say it has it, it's
- 5 implied by the presence of the purple top.
- 6 Q. Okay. But I haven't brought that actual tube out
- 7 for you to look at it so, but assuming that it
- 8 does, then it would not be terribly surprising
- 9 that some level of EDTA would be detected in that
- 10 still liquid form, right?
- 11 A. I would have expected that, yes.
- 12 Q. Okay. But the real question that is of interest
- here is the stains in the car of the vehicle,
- 14 right?
- 15 A. That's correct.
- 16 Q. And that's what you are saying Mr. --
- 17 Dr. LeBeau's report cannot rule out?
- 18 A. Exactly.
- 19 Q. Thank you.
- 20 THE COURT: All right. Members of the
- 21 jury, at this time we're going to take our lunch
- 22 break. I will remind you, again, not to discuss the
- 23 case in any fashion, during the lunch break. We'll
- resume about 1:00.
- 25 (Jury not present.)

1	THE COURT: You may be seated. Will the
2	You may be seated. Will the defense be ready to go
3	at 1:00
4	ATTORNEY BUTING: Yes, we will.
5	THE COURT: with the next witness?
6	ATTORNEY BUTING: Yes, we will.
7	THE COURT: Very we'll. We'll see you
8	then.
9	(Recess taken.)
10	THE COURT: Mr. Strang, at this time the
11	defense may call its next witness.
12	ATTORNEY STRANG: Thank you, your Honor.
13	And, actually, before I do that, and while I'm
14	thinking of it, I would move into evidence Exhibits
15	499 and 500, which relate to Ms Arvizu.
16	THE COURT: Any objection?
17	ATTORNEY GAHN: No objection.
18	THE COURT: Very well, those two exhibits
19	are admitted.
20	ATTORNEY STRANG: And then the next witness
21	is Dr. Scott Fairgrieve.
22	THE CLERK: Please remain standing and
23	raise your right hand.
24	DR. SCOTT FAIRGRIEVE, called as a
25	witness herein, having been first duly sworn, was

- examined and testified as follows: 1 THE CLERK: Please be seated. 2 3 THE WITNESS: Thank you. THE CLERK: Please state your name and 4 5 spell your last name for the record. THE WITNESS: Yes, my name is Dr. Scott 7 Fairgrieve, F-a-i-r-g-r-i-e-v-e. DIRECT EXAMINATION 8 BY ATTORNEY STRANG: 9 10 Q. Are we good on volume? Maybe just pull the mike down just a little bit? 11 12 Α. Is that better? 13 O. Yes. Probably so, yes. Good afternoon. 14 wonder if we could start, Dr. Fairgrieve, with 15 explaining to our jury why it is that we brought 16 you down from Laurentian University in Ontario, 17 Canada.
- A. I was requested by the defense counsel in this
 particular case to review the reports and
 circumstances surrounding the investigation of
 the Avery property and, specifically, with
 respect to cremated remains in this case and the
 forensic anthropologist report.
- 24 Q. And how -- how, in general, are you employed?
- 25 A. I am currently employed as the chair of the

- Department of Forensic Science at Laurentian
 University in Sudbury, Ontario, Canada. And I am
 also a forensic anthropology consultant to the
 Office of the Chief Coroner for Ontario.
- Q. Okay. Let me show you your curriculum vitae, which I have marked -- had marked as Exhibit 501. And we'll give the people a little bit of an overview of who you are without -- I promise you -- and without going through all 18 pages of this.
- 11 A. Okay.
- 12 Q. You have a bachelor's degree?
- 13 A. Yes, I have a bachelor of science in biological
 14 anthropology from the University of Toronto.
- 15 Q. Where did you take your education after that?
- 16 A. I then proceeded on to do my master's level
 17 degree at Cambridge University in England, also
 18 in biological anthropology.
- 19 Q. What is biological anthropology?
- A. It's the examination, and my specific speciality,
 of the human skeleton. We also refer to it as
 human osteology. And I'm an expert -- or
 received education in the area of the analysis of
 the skeleton in a variety of contexts, both
 archaeological and modern.

- 1 Q. Did you attain, what is it, a master's in
- 2 philosophy in biological anthropology from
- 3 Cambridge University?
- 4 A. That's correct. It's referred to as an M.Phil.
- 5 Degree.
- 6 Q. All right. You come back from Great Britain,
- obviously, at some point, back to Canada, and
- 8 where do you -- where do you go with your
- 9 education from there?
- 10 A. From there, I attended the University of Toronto
- 11 for my doctoral degree, a Ph.D. in human skeletal
- 12 biology within the Anthropology Department.
- 13 | O. When did you obtain the Ph.D.?
- 14 A. In 1993.
- 15 Q. What have you done in general, big picture, what
- 16 have you done with your professional life since
- 17 you completed the doctorate?
- 18 A. In general, I have, obviously, as a forensic
- 19 scientist, I belong to several associations, but
- in my actual work, I am employed, since 1991, at
- 21 Laurentian University as a forensic
- anthropologist and have undertaken teaching
- courses at the undergraduate level.
- 24 Q. Where is Laurentian University, specifically?
- 25 A. It's about -- It's in the town of Sudbury,

Ontario, which is a very well-known mining

community. It is located approximately four hour

drive north of Toronto.

- Q. What -- Give us a run down, if you would, on a little bit more about the faculty position you hold as Chair of the Department of Forensic Sciences at Laurentian?
- Well, I oversee the operation and administration Α. of the department; however, I'm also a teacher, if you like, a university professor. So I instruct students in various different courses, including forensic biology, introducing --introduction of forensic science, forensic anatomy of the human skeleton, as well as forensic analysis of the human skeleton.
 - Q. Outside of an undergraduate or graduate student classroom, do you do any training or teaching of law enforcement?
 - A. Yes, I have. I have -- actually, was invited, back in, I believe it was 2002, to form the very first course in recovery of human remains from crime scenes, for police officers; what we refer to in Canada as forensic identification officers, here they would be crime scene technicians, and that went until 2005.

- Q. Do you -- Are you involved in research as well as the practical work you described?
- 3 A. Yes, sir. I am very active in research.
- 4 Q. What is your primary area of research interest?
- A. My primary area is in the study and interpretation of cremated human remains. So any human tissues that are subjected to fire in a variety of circumstances, but more commonly in the forensic circumstances.
- 10 Q. Have you written anything about this?
- 11 A. I am published in the area of forensic cremains
 12 through journal articles as well as book chapters
 13 and conference presentations. And I have an
 14 upcoming book coming out through a publisher in
 15 the U.S. on the forensic cremation analysis and
 16 interpretation.
- 17 | O. And we can look for that at amazon.com soon?
- 18 A. I'm hopeful.
- Q. All right. Now, again, the jurors, I think, will probably have your resumé, so I don't want to go through everything, but give me a sense, give the jury a sense of the professional associations to which you gravitated or that you found, you know, to enrich your work?
- 25 A. Professional associations are very important to a

scientist, in growth for both peer review of your own work, but also further training and, basically, communicating with other members of your field.

I'm known as a fellow in the American

Academy of Forensic Sciences within the Physical

Anthropology Section. I'm a member of the

American College of Forensic Examiners

International and I'm also on the Editorial

Advisory Board for their publication known as the

Forensic Examiner.

- Q. Actually, I'm going to stop you right there.
- 13 A. Yes.

- Q. We have heard talk about peer reviewing articles; is that exactly what somebody on the Editorial Advisory Board does?
 - A. Well, in my case, from the editor of a specific journal, I would receive the actual article in question and they ask me to examine it for the science behind the article, in order to make sure that the procedures followed, and the way that the article is written, conforms to scientific standards.
 - Q. You are describing peer review, is that what peer review is?

- A. That's exactly what it is, literally a review by your colleagues.
- Q. Okay. Are any of the professional associations to which you belong tilted towards law enforcement or defense in the criminal justice system?
- A. Forensic science, as we deal with it, is meant to
 be an unbiased profession. We are to undertake
 analysis of evidence and present our findings of
 that evidence in courts of law via either
 reports, or through reports and testimony, such
 as here.
- 13 Q. Have you testified in court before today?
- 14 A. Never in American court; however, in Canadian
 15 courts, yes.
- Q. And I'm -- I'm -- I'm actually curious, who -who has called you as a witness in the past,
 which side?
- 19 A. I have only testified for the Crown in Canada,
 20 which is -- the equivalent here would be
 21 prosecution, so the State.
- Q. Okay. This is the first time both in an American court and being called by the defense?
- 24 A. That's correct.
- 25 Q. Okay. And I want to get now into the more -- the

- 1 more practical or field work that you do. And
- 2 I'm curious, is there a tie between the research
- 3 interest in cremated human remains, or cremains,
- 4 and the practical field work that you do?
- 5 A. Yes. Well, my interest in cremains came out of
- 6 the fact that I was being called in order to, not
- 7 only recover in the field, cremated remains, from
- 8 crime scenes, but also to interpret those
- 9 remains. And so my research has very much
- 10 centered on the problems and the challenges that
- one encounters with remains that are in such a
- 12 degraded state.
- 13 Q. Do you find yourself still called to consult at
- 14 crime scenes?
- 15 A. Yes, I am. I'm currently a consultant for the
- 16 Office of Chief Coroner in northern Ontario.
- 17 | O. Which covers how big an area?
- 18 A. Approximately western Europe. Land area, very
- 19 wide, from Sudbury on up through northern
- 20 Ontario, right up to Hudson Bay.
- 21 Q. Okay. So just part of the province.
- 22 A. Yes.
- 23 Q. But a large land area.
- 24 A. Yes.
- 25 Q. And who calls you in to crime scenes?

- A. The -- Usually the procedure is I'm sometimes

 contacted by police to tell me that there is a

 scene that they will suspect they will want me to

 attend; however, as per our protocol, I am called

 to the scene and to attend by the Regional

 Supervising Coroner and so I represent the

 Regional Coroner as far as --
- 8 Q. Okay.
- 9 A. -- activity is concerned.
- Q. So you may be working shoulder to shoulder with police officers, but you are there under auspices of the coroner -- auspices of the coroner, if I understand?
- 14 A. That is correct, yes.
- Q. Okay. When -- when you have a case, you are called to the field, crime scene, or suspected crime scene, and you have got human -- cremated human remains?
- 19 A. Yes.
- Q. What's -- What are the tasks for a forensic anthropologist like yourself in that role?
- A. Well, initially, what we do is, I will certainly
 meet first with the law enforcement officials who
 are responsible for the investigation as well as
 the forensic officers. And we will -- I will get

- background information from them, prior to even
 attending the scene.
- And, then, upon attending the scene we
- 4 | will examine the general area in order to -- how
- 5 to approach. I usually check to see if there is
- a path of contamination that has been initiated.
- 7 And we, essentially, work from the outside of the
- 8 scene to the inside. So I'm very much there
- 9 working shoulder to shoulder with the forensic
- 10 identification officers at the scene and --
- 11 Q. And --
- 12 A. -- and offering advice on how to do the recovery.
- 13 Q. Okay. And that's what we're talking about --
- 14 A. Yes.
- 15 Q. -- we're still at a point where we're trying to
- 16 recover --
- 17 A. Oh, yes.
- 18 | O. -- remains --
- 19 | A. Oh, yes.
- 20 Q. -- when it was at the site?
- 21 A. And documenting those remains at the scene.
- 22 Q. Okay. So contamination path and I think you just
- 23 said you work in --
- 24 A. Yes.
- 25 Q. -- from the edges?

A. Yeah.

1

15

16

17

18

19

20

21

22

23

24

25

- 2 Q. What are you trying to do?
- Well, we're first of all trying to preserve the 3 Α. context of the evidence as best as possible, and 4 5 to do as little contamination as possible to the actual scene. So by having a path of contamination, this is a pathway, if you like, 7 that the police officers will have established 8 9 saying, well, this is the way we got on to the 10 scene originally, so we're just going to keep walking on this path and not possibly contaminate 11 12 outside of that pathway.
- Q. Okay. So, in addition to preservation, then, what would be the next task?
 - A. Well, as with anything, as items are identified and, typically, because we're dealing with cremains, I'm the one to identify, okay, this is a cremain and that's a cremain. I would actually be indicating those and we would flag them, for example; in other words, mark them, without touching them, their location, so that we know where they are.

And we start from the outside, as I said before, from the areas of lowest concentration, so that we can clear other areas around the scene

and then work into where we suspect the highest concentration of the remains may be.

- Q. As you are working in, what are you -- what are you doing, if anything, to document what you are finding as you work your way in?
- A. As -- As I work with the ident officers, we -everything that's found, in order, is given an
 evidence number. And that is controlled by the
 forensic ident officers. So I will indicate an
 item, for example, and -- which is items, that
 is, within my area of expertise, in this case
 cremated remains.

And they will keep an evidence record log and they will say, what description should we give this. And I may say bone fragment, or something of that ilk, and it would be photographed and the flag would be remaining there and subsequently mapped into place.

- Q. By the time you are getting around to photographing the things that you found, has anything yet been touched, physically?
- A. No. Nothing is touched until the photography is done and -- but the mapping may be done a little later, because we leave the flags in place.
- Q. What goes around comes around, I think this jury

- has heard about the system of mapping that you have --
- 3 A. Sure.

- Q. -- now days. Tell us just a little bit about that?
 - A. Well, there's a few different ways to do it. I mean, one -- one way is to superimpose a sort of grid over the scene, which basically looks like a bunch of squares. And then you approach the scene such that you are taking care of the squares around the scene first, clearing those and then going in towards those areas of higher concentration. And that, generally, is done in order to control the method by which you are processing the scene.

There are instances, however, where we'll do a combination of this with an electronic means of documenting a scene. And that's using something known as a Total Station Unit, which is basically a surveyors -- computerized surveyors unit. And that helps us to generate a computerized map of the scene.

Q. When I say what goes around comes around, we have heard about the Total Station Unit already in this trial. But you -- you folks are using that

- 1 as well.
- 2 A. Oh, yes.

- Q. And what -- what are you -- what specifically are you mapping with that when you use it?
 - A. We're mapping sometimes individual fragments,

 perhaps fragments that are clustered together in

 a tight grouping, in a context. It could be long

 bones that we would see, or other elements of the

 skeleton. And those are getting numbered as we

 go along and their position is being noted. This

 way we get a distribution.
- Q. Why note the position of every single fragment that you find?
 - A. Well, documentation, it is required for us, first and foremost, for court purposes, in order to document where everything comes from in its original found location. Secondly, by documenting this, this can tell us all sorts of different things about the circumstances surrounding this find.

So what we would look for would be bones that happen to be in their relative position to one another, such as the bones of the lower arm being next to one another, and being close to or joined up with the bones of the upper arm.

1 We're interested in the position of the

body, if that can be ascertained. We're

3 interested in whether the remains have been

4 purposely manipulated, moved, redistributed,

5 crushed actively, mixed up or comingled. All

those things can be ascertained through proper

7 excavation and recovery technique.

- 8 Q. So with that background, I guess, let's -- let's
- 9 get specifically to this case and your role in
- 10 this case. Are you familiar with a Dr. Leslie
- 11 Eisenberg?
- 12 A. Yes, I am.
- 13 Q. How -- How do you know her, or how have you
- 14 | become familiar with her?
- 15 A. I have known Leslie for, must be over 10 years
- now, as colleagues through the American Academy
- 17 Forensic Science, the Physical Anthropology
- 18 | Section.
- 19 Q. Have you had a chance to review her report in
- 20 this case?
- 21 A. Yes, I have.
- 22 Q. And some photographs?
- 23 | A. Yes.
- 24 Q. What -- What can you tell us about the common
- ground you share with Dr. Eisenberg, the points

on which you agree with her work, based on the work you have done here?

- A. Oh, I agree with many points of Dr. Eisenberg's research or study on, in this case, and her report. I certainly have no reason to question the parts of her analysis that deal with the fact that the remains are representative of a single individual, an individual who is female, as well as a mature individual, that is, not a pubescent if you like, or somebody who is post-pubescent.
- Q. Do you have any reason to disagree with Dr. Eisenberg's assessment of the rough age range?
- A. She did note in her report that there was a lack of arthritic changes to the skeleton. And as I recall, to the best of my ability, she was indicating an age, an upper age limit of 30 to 35 years. That can be problematic. I agree that there was no lipping, however there are --
- Q. Stop. Time out. That was a technical word.
- A. Pardon me, sorry. There were no arthritic changes. And I certainly agree from what the photos were I saw, I certainly didn't see any.

 However, she's using that as a basis to say 30 to 35 and I know of no empirical studies to support

- 1 that. That would be purely speculation.
- 2 Q. But -- But you have no reason to doubt it either,
- I mean, you are not -- I take it you don't --
- 4 A. Not one way or another.
- 5 Q. -- (inaudible) over that.
- 6 A. No. No.
- 7 Q. What else do you find yourself in agreement with?
- 8 A. Specifically, her analysis of the trauma to the
- 9 head, I am certainly in agreement with. She
- indicated two gunshot wounds and I'm in agreement
- 11 with that.
- 12 Q. When you say you are in agreement with two gun
- shot wounds, as a forensic anthropologist, are
- 14 you qualified to say, yeah, I look at that defect
- in a bone and in my professional judgment it's an
- 16 entrance wound from a bullet?
- 17 A. What we do is, we describe the actual
- 18 characteristics of a specific lesion or
- 19 discontinuity, if you like, an opening. And we
- look at the various signatures of that. And, in
- 21 fact, in this case, certainly, they do conform
- 22 with a high velocity projectile, meaning a
- 23 bullet.
- 24 Q. Do you think, as a forensic anthropologist, that
- you also, though, could take the next step from

- gunshot wound to assigning a manner of death or a cause of death.
- 3 The problem with that is that with wounds such as this, in my profession, we will tend to report 4 that something such as this is perimortem, 5 literally meaning around the time of death. 7 cannot prove that that was actually the cause of death. We can't prove that it happened shortly 8 9 after death, or it was a wound that was shortly 10 before death and the person survived for a few minutes and may have been killed through some 11 12 other means.

Because we are dealing with skeletal remains, I do not have the soft tissue that a pathologist does in order to make some of these other determinations; hence, we usually are stuck with the term perimortem.

- Q. Okay. And here, in specific, after your review of the occipital bone fragment and the parietal bone fragment --
- 21 A. Yes.

13

14

15

16

17

18

19

- Q. -- and the unnatural opening or defect, you are calling it a lesion --
- 24 A. Yeah.
- 25 Q. -- discontinuity, the bullet hole?

- 1 A. Yeah.
- 2 Q. Okay.
- 3 A. Trauma.
- 4 \mid Q. Are you able to offer an opinion, as a forensic
- anthropologist, on whether those gunshot wounds
- 6 occurred after the person was dead or before the
- 7 person was dead?
- 8 A. No, I cannot.
- 9 Q. Why not?
- 10 A. Well, the problem is that I just don't know what
- actually did cause the death. I'm a reasonable
- 12 person in that, yes, I recognize that gunshot
- wounds to the head are not conducive of long
- 14 life, however --
- 15 ATTORNEY FALLON: Your Honor, I'm going to
- interpose an objection at this point, and it may be
- 17 cleared up with a few more questions from counsel,
- 18 | but I don't think there's been any foundation for
- 19 this gentleman to render an opinion, vis-a-vis,
- 20 cause of death. Such was not rendered by
- 21 Dr. Eisenberg either, I might add.
- 22 | Q. (By Attorney Strang)~ Well, actually, I think
- 23 | we'll step back. I mean --
- 24 A. Sure.
- 25 | Q. -- if I wasn't clear about this, I want to be.

- 1 As a forensic anthropologist, are you
- 2 professionally qualified to render an opinion on
- 3 cause of death?
- 4 A. No.
- 5 Q. As a forensic anthropologist are you
- 6 professionally qualified to render an opinion on
- 7 manner of death?
- 8 A. No.
- 9 Q. Okay. And I guess, if I understand you, what you
- are saying here is, you cannot assign a manner of
- 11 death within your profession or calling?
- 12 A. No, we cannot. And, certainly, in my
- jurisdiction as well, what -- how we proceed is
- that I will evaluate trauma and then this goes to
- the forensic pathologist, as well as the coroner
- or medical examiner, as the case may be, and they
- make that final determination.
- 18 Q. Now, as a forensic anthropologist, and one who's
- 19 got a strong interest in cremated human
- 20 remains --
- 21 A. Yes.
- 22 | Q. -- can you offer us an opinion on whether the --
- a gunshot wound to the head, for example, the two
- 24 here, were before or after burning of the bones;
- is that something you can do?

- 1 A. Yes. Yes, that is something I can do.
- 2 Q. And do you agree or disagree with Dr. Eisenberg's
- 3 conclusion that the gunshot wounds here were
- 4 before burning of the bones?
- 5 A. Yes, I do agree with that.
- 6 Q. Okay. But whether the gunshot wounds were before
- 7 or after the death of the person on that --
- 8 A. I cannot say.
- 9 Q. Okay. Within the field of forensic anthropology
- 10 you cannot say that?
- 11 A. That's correct.
- 12 Q. Okay. Any other points of agreement with
- Dr. Eisenberg's work here?
- 14 A. I agree that she -- I agree with her opinion that
- she was not able to determine the ancestry of the
- individual, or the stature of the individual.
- 17 | O. Height.
- 18 A. Yes.
- 19 Q. Okay. What -- What did the -- You just looked at
- 20 photographs, not actual bone fragments, correct?
- 21 A. That's correct.
- 22 Q. Okay. What did -- What did you see in the
- 23 condition, the exterior condition of the bone
- 24 | fragments that -- that you saw in photographs?
- 25 A. Well, certainly subjected to an intense heating

event, a fire. The types of fractures that I saw there were very consistent with those caused by heat, so you have what we generally refer to as heat induced fractures. And there's a variety of these.

- Q. Tell -- Tell us about those, a little bit about heat induced fractures.
- Heat induced fractures are actually caused Α. Sure. during the burning process, to any sort of tissue, specifically bone in this case. Because, when you have a fire, it's actually leaching the water out. So you actually are losing water content. And as a result of that, you get a shrinkage of the bone that's occurring and then you get a fracturing that occurs as well.
 - Q. And does it happen in the heating phase, or in the cooling phase, or just throughout?
 - A. Initially, what happens is, as it's being consumed the bone will heat up, and with anything that does heat up, it expands. It's been found through experimentation that the actual -- a lot of the fracturing does really get undertaken at the cooling stage. So as the bone cools, if you -- particularly if it's been in a fire, let's say like a house fire, or something like that,

and fire personnel come along and put water on it to cool it fast, that will actually cause it to fracture even more.

However, with fires that are attended by a perpetrator, you do get the fracturing taking place naturally; however, the bone will remain in its same location as where it was put with the rest of the body at the time.

- Q. We heard -- We heard testimony from Dr. Eisenberg to the effect that the recovery process here of the human bone fragments she described was well done. I'm not quoting her exactly, but she -- she offered some testimony to that affect. Is that a view with which you can agree?
- 15 A. I'm afraid I have to differ with that opinion.
- 16 | O. Why?

1

2

3

4

5

6

7

8

9

10

11

12

13

- A. Well, from the photographs that I received, first of all, the documentation with the photography was fairly poor. It was very difficult to tell anything as far as in situ, or the original location.
- 22 Q. In situ meaning the original site --
- 23 | A. Yes.
- 24 | 0. -- as found?
- 25 A. As found, would probably be a better way to put

So the photography was very poor from that it. perspective. The accounts that I understand occurred as far as the excavation procedures, there was no systematic approach to the collection of the evidence at first processing, from what I saw. I know there was no grid imposed at that time, during the initial excavation.

I was informed that shovels were used in order to do that and it wasn't, shall we say, a more forensic archaeological approach and that, essentially, Dr. Eisenberg received the materials directly from the police services involved, without her having been in the field.

- Q. Okay. So other than nitpicking, why does this matter. Why does it matter?
- A. Well, it matters as far as what I mentioned about the documentation and being able to tell things about the circumstances surrounding the burning of the body. One of things the context can tell you, if it's well done, is to approach the question of where the body was burned. Was it moved? Was this the actual location or not?
- Q. How do you approach drawing a conclusion about where the original burn site, or where the body

was burned; how do you approach that through a proper recovery?

A. Well, within the recovery and, certainly, in recoveries I have been involved with, what is done is, as you proceed through the careful excavation, removing soil, soil is removed from a particular square, for example, that you have identified as being of interest within your grid. And you proceed, vertically, from the highest point of that square, down to a level until you start finding material.

When you find that material, you clear it off very carefully. You actually switch from, shall we say, a trowel type implement, to actually wooden implements, because they have the same approximate density as bone and even cremated bones, so you have less risk of actually causing damage, shall we say, extra damage to the remains.

- Q. Why is that a concern, by the way, with burnt bone?
- A. Well, burnt bone is extremely fragile. You -- We tend to have a little axiom that we refer to in teaching cremation studies to students, and that is, if you take a cremated bone and you pick up

one bone, you end up putting down 10. What that means is, that it's very fragile and it can, quite often, when moved, unless it's been, shall we say, fixed together in some fashion, using a glue or something of that ilk, you are actually going to pick it up and you are going to cause some damage.

- Q. Now, is that -- is that breakage, or that fragility, universally true through all the stages of from, you know, light charring to a complete calcination of the bone?
- A. No, it's -- because a body burns what we call differentially, in other words, it doesn't burn evenly, you actually have some areas of the skeleton that are going to burn, or the body, that will burn more quickly.

If you think about it, areas where there's not a lot of skin coverage, such as the ends of fingers, the top of the head, these sorts of areas will burn more quickly. So we'll actually see them go through the various different color changes and stages of the fire process ahead of other areas, such as the torso. More meat on the torso, certainly mine. And that's going to take longer to actually be

- consumed, as opposed to say the limbs or the head and face and such.
- Q. So when -- But I'm curious, I mean, does the actual fragility, if you will, of the bone --
 - A. Yes, it's going to vary as a result of that. So the earlier on, where you have the dark blackened, if you like, charring of the bone, is not as fragile as the bone that has gone to sort of a gray-blue stage and approaching what we call a calcined stage.

The actual end stage, if you like, the ultimate extreme of burning bone is where we have the white calcined stage. And, in fact, the molecules of the minerals in the bone actually reorient themselves into a structure that is more akin to porcelain, so it actually becomes quite strong at that point.

- Q. Okay. So it's going through sort of a curve where it's becoming more and more fragile. And at the final stage, you are saying it's actually -- regain --
- 22 A. It can be.

- 23 Q. -- some strength.
- A. It's very much dependent upon the actual density of the bone.

- Q. Okay. All right. And you were -- you were explaining how this, you know, this sort of layered excavation and identifying pieces in place --
- 5 A. Yes.

7

8

9

- Q. -- helps -- helps get you to being able to draw a conclusion about whether the body was burned there, or moved, or, you know, otherwise disturbed, and I want to go back to that.
- The actual -- When we actually do an 10 Α. Sure. excavation like this, and let's say we come 11 12 across, as I have, I will describe an actual 13 scene I have been involved with, the lower end of 14 the upper arm bone. And upon excavation, by 15 excavating it carefully, one can see the actual 16 lines of the fracture from the heat and see that, 17 yes, this bone is in a location; however, if we 18 move this bone, it is going to fall apart. 19 tells us that this is the original context of 20 where that was burned, because if we moved it, we 21 would already find it in the smaller pieces.
 - Q. Okay. All right.
- 23 A. Quite logically, you know, if you have got
 24 something that's -- if you -- it's akin to taking
 25 a piece of glass and putting it on the floor and

- 1 stepping on it; well, you can see the outline of
- 2 the glass and the size of the piece of glass, but
- you will also see all the cracks. So if you move
- 4 it, you are not going to be able to see that
- 5 outline any more in it's original form.
- 6 Q. Okay. Do you -- Do you agree here with
- 7 Dr. Eisenberg that it's clear in this case that
- 8 bones were moved?
- 9 A. I agree that bones were moved.
- 10 Q. In the human -- When I say bones, I'm talking
- 11 about human --
- 12 A. Human remains.
- 13 | O. -- human remains.
- 14 A. Yes.
- 15 Q. Okay. You -- you -- you do agree with that?
- 16 A. I do.
- 17 O. Okay. And based on the recovery method that was
- 18 used here, are you able to offer an opinion, to a
- 19 reasonable degree of scientific certainty, about
- where these human remains were burned?
- 21 A. No, I'm not.
- 22 | O. Why not?
- 23 | A. Well, the fact is, that because I don't have any
- 24 records from which to examine that would actually
- 25 indicate to me that there are bones in the

- original location, where they were burned, I can't offer an opinion on that.
 - Q. You know, when -- if you -- if you go to a site and you have the opportunity to recover a burnt human remains, are you able to identify the, you know, the specific bones by name and location in the body when you are looking at them in place?
- 8 A. Yes.

4

5

7

22

23

24

- 9 Q. How is that?
- 10 Well, there are anatomical landmarks on the Α. various different bones. And if they are in 11 12 their original location where they were burned, 13 we'll even see them on what we call relative 14 anatomical position. So that if you burn remains 15 in a specific location and no other force acts 16 upon them except the actual burning process, then 17 the materials that make up the head will be at 18 the head end of the body and then you will have 19 the neck, the thorax, and then the legs and then 20 the arms off to the side. So that's -- that 21 makes logical sense.
 - Q. How -- How about when these things are fractured, because I get -- I gather from what you said a few minutes ago, some breakage and fracturing will occur just because of the heating and

- 1 initial contraction as the bone dries?
- 2 A. Yeah, the heat actually will definitely cause
- 3 fracturing and you see all sorts of different
- 4 types of fractures within the bone itself.
- 5 Q. And -- But you're -- But you're still able, if
- 6 the bones are in place, to identify the type of
- 7 bone you are looking at?
- 8 A. Oh, yes.
- 9 Q. And that's something a forensic anthropologist
- 10 can do with training?
- 11 A. Oh, yes, absolutely.
- 12 Q. Back to the moving of bones now, when you say you
- agree that human remains were moved here, are you
- talking about moved a little bit within one site,
- or moved from point A to point B, or both?
- 16 A. Given that there are three locations, from my
- understanding, where we have bone having been
- 18 documented to have come from, then we are talking
- point A to B or to C, as the case may be.
- 20 Q. Okay. Now, we have been calling these the area
- 21 behind Steven Avery's garage, or sometimes called
- 22 it the burn area?
- 23 | A. Yes.
- 24 Q. The Janda burn barrel, is that --
- 25 A. Yes.

- 1 Q. -- the second. And then there's what I call, at
- 2 least, the quarry pile or quarry site.
- 3 A. Yes.
- 4 Q. On that, Dr. Eisenberg testified, as I recall,
- 5 that she only suspected that she was seeing human
- 6 bone fragments, maybe two from the pelvis, one
- 7 from the iliac crest and that there were other
- 8 bones that she initially suspected to be human,
- 9 some of which she later determined were animal --
- 10 A. Yes.
- 11 Q. -- bone, and some of which remain undetermined,
- 12 still possibly human and possibly not?
- 13 A. Yes, that's my understanding.
- 14 Q. Do you have any reason to disagree with that?
- 15 A. No, I do not.
- 16 Q. Okay. So -- But -- But as I understand it, in
- 17 your opinion, human bone fragments were found in
- 18 | the Janda burn barrel?
- 19 A. Yes, that's my understanding from the report.
- 20 Q. And human bone fragments behind Mr. Avery's
- 21 garage?
- 22 A. Yes, that's correct.
- 23 | Q. Okay. So, at least those two sites, to a
- 24 reasonable degree of scientific certainty, in
- 25 your opinion, you got human bone?

- 1 A. Yes, I take Dr. Eisenberg at her word.
- Q. Okay. And, again, I think we touched on this,
- 3 but do you see any evidence, in your independent
- 4 review, that we have the remains of more than one
- 5 person?
- 6 A. No, it is consistent, from the inventory that she
- 7 provides in her report, it's consistent with one
- 8 individual.
- 9 Q. Are you able to say anything about whether bone
- fragments in the area behind the garage were or
- were not moved, disturbed, or the verb was you
- used, in that general area behind Mr. Avery's
- 13 garage?
- 14 A. Based on the recovery techniques, I have no
- evidence or any documentation to be able to make
- 16 any determination.
- 17 | Q. Well, can you agree with Dr. Eisenberg's opinion,
- as I recall it, that probably the area behind
- 19 Mr. Avery's garage was the original burn site for
- 20 the bone fragments, wherever found?
- 21 A. I cannot agree with that at this point.
- 22 | O. Why not?
- 23 A. Well, because, firstly, the documentation. The
- 24 documentation itself did not lend itself to that
- interpretation, so I can make no inference

- 1 whatsoever from that.
- Q. Okay. Well, let's -- let's go to the reasons
 that Dr. Eisenberg gave in support of her -- her
 view. She -- she -- she told us that the greater
 amount -- the greatest amount, by far, of human
 bone or human remains, was found behind the
 garage, with much less found in the Janda burn
 barrel, and still much less, if it was human at
- 10 A. Yes, that's what I understand.

all, at the quarry site?

- 12 Does that, in your professional opinion, support
 12 the view that, therefore, the Avery garage was
 13 the most likely burn site?
- 14 A. No.

- 15 Q. Why not?
- 16 I have been involved in cases where human Α. 17 cremains have been burned in one location and 18 moved to another location. And in those cases, 19 in fact, the actual location where the bones have 20 been moved to, in other words, their ultimate 21 location of where they have been buried, or 22 placed in another context, tends to be the location where most of the remains are. And in 23 24 those -- in that instance, for example, I have 25 recovered elements or parts of the skeleton from

- 1 all areas of the body.
- 2 Q. Okay. Wait a minute, I want to stop you.
- 3 A. Sure.
- Q. Are you saying that in your experience, when -when burnt bones are moved, you tend to find the
 majority of them away from the place in which

7 they were burned; in other words, find them in

8 the place to which they were moved, not from

9 which they were moved?

10 ATTORNEY FALLON: Objection, leading.

11 ATTORNEY STRANG: I want to make sure I

12 understood your testimony.

THE COURT: I'm going to allow it.

- 14 A. I understand that, from your question, the answer
- is, yes, in the cases I have dealt with where
- human cremains have been moved, the majority of
- them have been from the body and making up the
- largest portion of the body, from the ultimate
- final place where they were actually moved to.
 - Q. When you had those situations, how have you been
- able to determine that?
- 22 A. As far as the numbers, or --
- Q. No, the -- you know, that the bones were moved to
- 24 this place.

20

25 A. Well, we have found small fragments in some in

- situ, or shall we say the original location of the burn, determined by the excavation techniques

 I have told you about where items have been missed. And then other -- all the other items have been taken and moved.
 - Q. Well, and this brings me back to Dr. Eisenberg, because it's -- as I recall, the second point she made in support of the conclusion that the area behind the garage was the probable burn site, is that that's where she found the smaller, more delicate bones, facial bones, dental structures, that kind of thing. Does finding the smaller and more delicate bone fragments support the conclusion, in your experience, that this must be the place where the original burn occurred?
- A. No, it does not.
- 17 | O. Why not?

- A. Well, we have actually been able to recover
 fragmentary teeth, facial bones, very small bones
 from the body, including even we found bones from
 the middle ear, which are about a millimeter in
 size, in one of these locations where the bones
 have been moved to.
 - Q. In other words, they have survived -- some of these small bones have survived moving?

- 1 A. Yes, they have.
- 2 Q. And then identifiable in another place?
- 3 A. Yes, that's correct.
- 4 Q. Say the bones in the middle ear?
- 5 A. Yes.
- 6 Q. How many of these bones are there?
- 7 A. Three in each middle ear.
- 8 | O. One millimeter each?
- 9 A. Approximately, yeah.
- 10 Q. Okay. Well, and I think the third thing, as I
- 11 recall Dr. Eisenberg's testimony, which she cited
- in support of her opinion, that the area behind
- the garage was the probable burn site, is that it
- looked like there had been only one burn event;
- 15 you know, that there had been only one fire. Do
- 16 you follow what I'm saying, everything had been
- 17 burned in one place?
- 18 | A. Yes.
- 19 Q. Does that support the opinion that the Avery
- 20 garage was the probable site?
- 21 | A. Not necessarily, as a result -- one cannot tell
- 22 how many burns actually took place in that
- location. From my own experience, I have
- 24 actually dealt with cremation cases where
- 25 somebody has actually used a traditional burn

- area in there own yard for the location of a burn
- itself. So if there's a fire pit that's at hand,
- 3 then that's where it's been.
- 4 Q. Well, but I guess I'm talking about cases in
- 5 which we're agreed that bones have been moved --
- 6 A. Yes.
- 7 Q. -- after burning.
- 8 A. Yes, that is, in fact, the case, yes. We do have
- 9 instances where there can be even re-burning
- going on and certainly burns going on before
- 11 that. So you can't tell how many burn events
- 12 took place, that's the bottom line.
- 13 Q. Okay. Can you -- Can you give us an opinion
- about where the original burn site was for the
- human remains, eventually given to Dr. Eisenberg?
- 16 A. No, I cannot, not from the evidence that I have
- 17 reviewed.
- 18 | Q. Is -- Is -- Can you rule out the area behind the
- 19 Avery garage?
- 20 A. The way I would phrase it is, I fail to exclude
- 21 it.
- 22 Q. So, in other words, it's a possible place?
- 23 A. Certainly.
- 24 Q. Okay.
- 25 A. Certainly.

- 1 Q. Based on the information you have, were there
- other possible burn sites, let's say, on the
- 3 larger Avery property?
- 4 A. Oh, certainly, yes.
- 5 Q. Such as?
- 6 A. The barrel for one; I -- I can't rule that out.
- 7 My understanding, from the scene of the actual
- 8 overall property, that there is a wood type of
- 9 furnace, I understand, on the property. And
- 10 there's even, as I recall, an aluminum smelter on
- 11 the property.
- 12 Q. Okay. Now, you personally haven't looked at any
- of these?
- 14 A. I have not examined any of these. I have never
- been to the Avery property.
- 16 Q. All right. Yet alone in November of 2005?
- 17 A. Not at all.
- 18 Q. Okay. And what -- what can you say about other
- 19 unknown possible burn sites here?
- 20 A. Well, I can't exclude any other location as being
- 21 impossible, because simply I have no evidence to
- 22 that affect.
- 23 | Q. Well, let's -- let's go back --
- 24 ATTORNEY FALLON: Your Honor, may counsel
- and I approach the bench?

1 THE COURT: Sure.

2 (Side bar taken.)

THE COURT: Members of the jury, we're going to take a short break at this time. I remind you not to discuss the case during the break. You are excused at this time.

(Jury not present.)

THE COURT: And, Dr. Fairgrieve, I will have you step out in the hallway at this time.

THE WITNESS: Okay. Thank you.

THE COURT: Please be seated. I will indicate for the record that Attorney Fallon asked for a side bar and raised an issue which I suggested be raised on the record, outside the presence of the jury. At this time the jury has been excused and the witness is also excused from the courtroom.

Mr. Fallon.

ATTORNEY FALLON: Yes, thank you, Judge. I just wanted to express concern, I don't know where counsel is going with the rest of this examination on this point. But from my review of the amended disclosure of expert witness, Scott Fairgrieve, the amended disclosure states, at the bottom of page four, most notably the first full sentence on page five, that there would be an opinion expressed that

there is no evidence that these cremains were originally burned in the barrel where they were found.

So the testimony, as elicited by Dr.

Fairgrieve, it's not the opinion that we were led to believe would be he expressed. And, again, this was one of the reasons we filed our demand for a disclosure -- full disclosure in a report, for fear that such an opinion like this would be expressed, without notice to the State.

THE COURT: Mr. Strang.

ATTORNEY STRANG: Yes, and I understand the confusion, which I probably created in the summary here, or maybe here, although I don't think he's offered any opinion that bones were burned in the burn barrel. What this is meant to say and what I will assure counsel and the Court, is that Dr. Fairgrieve is -- is -- I expect him to say that, I have no evidence that allows me to conclude where these bones were burned. I can't -- I can't say they were burned in the burn barrel. I can't say they were burned behind the garage. I can't say they were burned anywhere else. In other words, I can't assign a place, nor can I necessarily rule out possible burn sites.

So I do understand the concern, because the specific sentence says, there is no evidence that these cremains were originally burned in the barrel where they were found. And that is his opinion, in the sense that, I can't say they were burned there, I don't have evidence that the body was burned in the barrel. What I expect him to say is, I -- I can't rule out, or I -- I fail to exclude any possible burn site, we'll just never know, is the bottom line.

ATTORNEY FALLON: That's an entirely -That's an entirely different -- well, not entirely
different, but it's clearly a different opinion. He
is saying here, they were not burned in the burn
barrel. That's what we expected him to say. Now
he's saying, I can't rule it out.

ATTORNEY STRANG: It doesn't -- it doesn't say that. I mean, I understand the confusion and I --

THE COURT: Well, there is a difference between saying I can't rule out the burn barrel and saying there's no evidence to suggest that they were burned in the burn barrel. Perhaps that's something the State can bring up on cross-examination. Did the -- did the report come from the doctor or --

ATTORNEY FALLON: No, it's from counsel, there is no report, that's our problem.

that we filed of potential expert witnesses, is the overall -- the broader opinion here is that he may agree with, challenge, or differ with any of the opinions offered by the State's expert forensic anthropologist and, more particularly, I'm quoting from page three of the disclosure, Dr. Fairgrieve may testify that while it is possible that the cremains found were originally burned in the pit behind Steven Avery's garage, in his opinion it was also possible that they were burned in another location.

He goes on to mention the smelter and the wood furnace and in his opinion it is possible that the cremains were rendered at either of those locations or another undetermined location. And that is the intended scope of the testimony.

THE COURT: Well, taking what you just read, together with what Mr. Fallon just read, I would interpret that to mean they could have been burned in another location besides behind the garage. They could have been burned in the smelter

or whatever the other reference was, but I would have interpreted it as excluding the burn barrel.

ATTORNEY STRANG: No, he won't say that.

He's saying, I can't exclude it, but neither do I

have any evidence that they were burned in the burn

barrel.

ATTORNEY FALLON: Well, I guess I disagree. I think the opinion should be excluded. The language that he read is helpful on the one hand, but not helpful on the other; in so far as we fully expected Dr. Fairgrieve to refute some, none, or all of the opinions expressed in Dr. Eisenberg's report. That's certainly fair game and I don't have a problem with that. But then to try to say he may offer some other opinions about some other stuff, to which we're not privy yet, that creates the whole problem of not having a report in the first place from which to base a cross-examination upon.

So I understand counsel's point, but I don't know how you get around the fact that he's saying, it wasn't in the burn barrel, so that leaves us the burn pit, the smelter, the boiler, or some other place, God knows where. But it certainly doesn't include the barrel.

ATTORNEY STRANG: No, what he's saying is,

I have no evidence that they were burned in the barrel. I can't rule it out, but I have no evidence that it happened.

THE COURT: All right.

ATTORNEY STRANG: And it might be helpful to -- if we could go back with the court reporter and find out just exactly where we were when we stopped.

THE COURT: Before we do that, I'm going to rule as follows: I believe that the information was slightly misleading, but not so much so that I'm going to grant a remedy to prevent this witness from giving the testimony he did; that is, there is not a significant difference between saying there's no evidence to suggest it was burned in the barrel and based on the evidence available, essentially, I have no idea where it was burned.

I understand what you are saying

Mr. Fallon, I think there is somewhat of a

difference, but I'm going to rule that it's not
enough of a difference to impose a sanction on
the defense.

ATTORNEY FALLON: Very well. Thank you.

ATTORNEY STRANG: And I do want to go back so that I -- I really can try to steer away from any

1 problem I created.

THE COURT: All right. Let's go off the

3 record for a couple of minutes before we bring the

4 jury back in.

5 (Brief recess.)

6 THE COURT: All right. We'll bring the

7 jury back in at this time.

8 (Jury present.)

9 THE COURT: You may be seated. And,

Mr. Strang, you may resume.

11 ATTORNEY STRANG: Thank you.

- 12 Q. (By Attorney Strang)~ Dr. Fairgrieve, within the
- field of forensic anthropology and drawing on

14 your experience with cremated human remains, are

you able to offer an opinion, to any reasonable

degree of scientific certainty, about whether the

remains found here were burned in the area behind

18 Mr. Avery's garage?

19 A. No, I'm not.

- 20 Q. Are you able to offer an opinion, to a reasonable
- 21 degree of scientific certainty, that the remains
- 22 here were burned in any other particular
- 23 location?
- 24 A. No, I am not.
- 25 Q. On the evidence you have, to a reasonable degree

- of scientific certainty, are you able to rule out
- 2 any possible burn site?
- 3 A. No, I am not.
- 4 Q. Are you able to say that, to a reasonable degree
- of scientific certainty, bone -- human bones here
- 6 were moved, or remains were moved, after burning?
- 7 A. Yes.
- 8 Q. What is your opinion on that?
- 9 A. Well, the fact that we have burned bones in at
- 10 least two locations, logically, they have been
- moved.
- 12 Q. Are you able to offer an opinion about the means
- by which those were moved, or the, you know, the
- mode of transport --
- 15 A. No, I am not.
- 16 Q. -- of the bones. Are you able to rule anything
- 17 out in that respect?
- 18 A. No, I am not.
- 19 Q. And in your professional experience, what
- 20 significance, if any, do you assign to the
- 21 majority of bone fragment being found behind
- 22 Mr. Avery's garage?
- 23 | A. Just the fact that the majority of the bones
- 24 representing the individual are in that position.
- 25 Q. And in your experience, is that more consistent

- with being a place that bones were moved to or bones were moved from?
- 3 A. To.
- Q. What, if any, significance do you assign to the fact that somewhat larger bone fragments, in general, or on average, may have been found in the Janda burn barrel than on average were found behind the Avery garage?
- 9 A. I don't really attach any significance to that other than an incomplete movement.
- 11 Q. Why not?
- A. Well, the fact that things do get left behind, I
 don't know the motivation, as far as what's been
 going on behind the actual movement of these
 remains, and so why they are in one place and not
 completely moved to another is beyond my
 understanding.
- Q. Okay. And how about size, the relative size of the fragments, does that tell you anything about movement, or where these -- why these things were found where they were found?
- 22 A. Not specifically, no.
- Q. Is it sometimes difficult, in the field, at a
 burn site, to identify cremated human remains, I
 mean by the -- to the naked eye?

- A. To the trained eye, we do recognize specific

 human elements, and it is possible, but it always

 depends on what is present at the scene.
 - Q. And I'm not sure, I want to chase that just a little bit. I mean, with burnt remains, is it always obvious to the untrained eye what one is looking at?
- 8 A. No.

4

5

7

19

20

21

22

23

24

- 9 Q. Why not?
- Well, it takes -- In order to be able to 10 Α. recognize human cremains, you are going to have 11 12 to have some fairly advanced training in the 13 anatomy of the human skeleton and what bones look 14 like. And also what, specifically, human bones 15 look like, because people will burn garbage 16 outside and there will be remnants from meals and 17 things like that, and being able to distinguish 18 animal from human, so that does take training.
 - Q. Did you see any differences that struck you, in your experience, as significant, in the range of heat damage to the bones found at either of the two, or possibly three, locations?
 - A. From what I recall, the bones from the pit area, as I recall, seemed to be more calcined, that is, towards the white stage; and I believe there was

- a higher preponderance of charred remains from
- 2 the burn barrel.
- 3 Q. And which -- which, if either, would be more
- 4 easily identified to the untrained eye as being
- 5 human bone?
- 6 A. Oh, the charred remains, the ones that are white
- 7 charred.
- 8 Q. More -- More easy by color or appearance than
- 9 the --
- 10 A. Form.
- 11 Q. I'm sorry?
- 12 A. Due to its form, shape.
- 13 ATTORNEY STRANG: Thank you. That's all I
- have.
- THE WITNESS: Thank you.
- 16 THE COURT: Mr. Fallon.
- 17 CROSS-EXAMINATION
- 18 BY ATTORNEY FALLON:
- 19 O. Good afternoon, Doctor.
- 20 A. Good afternoon.
- 21 Q. Welcome to Wisconsin.
- 22 A. Thank you.
- 23 Q. Is this your first trip?
- 24 A. No, I have been to Wisconsin before.
- 25 Q. You have. But this is the first time you have

- been asked to be a witness in a case, I take it.
- 2 A. That is correct.
- 3 Q. All right. And this is the first time you have
- 4 been here with respect to this case?
- 5 A. Yes, it is.
- 6 Q. Okay. Now, I take it from your experience and
- 7 training and your -- more importantly your resumé
- 8 and your work for the Crown, it looks like you
- 9 have done a fair amount of forensic work?
- 10 A. Yes.
- 11 Q. And I take it you are routinely asked to go to
- what are suspected crime scenes and assist law
- enforcement in the processing of those?
- 14 A. That is correct.
- 15 Q. All right. And you have been doing that for
- 16 about 15 years?
- 17 A. Sixteen.
- 18 Q. Sixteen years?
- 19 A. Sixteen, yes.
- 20 Q. All right. And I take it, in the Province of
- 21 Ontario, you have provided expert testimony on a
- 22 number of occasions?
- 23 | A. That is correct.
- 24 Q. And, frequently, if not almost in all cases, as I
- 25 understood it, you provided testimony for the

- 1 Crown or the prosecutor?
- 2 A. All cases.
- 3 Q. All right. Okay. For this case, help us out
- 4 here and tell us what information you had to
- 5 assist you in expressing the opinions you have
- 6 expressed this afternoon.
- 7 A. I received photographic files in the form of CDs.
- 8 I received reports from -- that were, shall I
- 9 say, compiled by Dr. Eisenberg.
- 10 Q. All right.
- 11 A. I have received a transcript of testimony of
- Dr. Eisenberg's from, I believe it was a
- preliminary hearing. And I received background
- 14 from the defense concerning the circumstances
- 15 surrounding the case.
- 16 Q. Background from the defense?
- 17 A. Yes.
- 18 | Q. All right. We'll get to that in a minute. So
- 19 that I'm clear, in terms of the documents you had
- 20 for purposes of expressing the opinion today, you
- 21 had the preliminary and final report of
- 22 Dr. Eisenberg?
- 23 A. Correct.
- 24 Q. You had a copy of her testimony from the
- 25 preliminary examination in this case, which is

now about 14 months ago, I guess? 1 ATTORNEY STRANG: Let's just take one 2 moment at side bar, counsel, and your Honor, if we 3 4 may. Members of the jury, I'm going 5 THE COURT: to excuse you for a much shorter period than the 6 7 short period I just excused you for a few minutes ago. You are excused at this time. 8 9 (Jury not present.) 10 THE COURT: You may be seated. Mr. Strang. 11 ATTORNEY STRANG: I think probably the best way to spend the time is just to go off the record 12 13 and counsel can try to work out here where he's 14 going and how we get there without, you know, going 15 into inadmissible material. 16 THE COURT: Go ahead. We'll go off the 17 record for a minute. 18 (Off record discussion.) 19 THE COURT: All right. Counsel, before I 20 bring the jury back, since we did have a side bar, I 21 will leave it to one of the two of you to put 22 something on the record concerning the contact. 23 ATTORNEY STRANG: I interrupted Mr. 24 Fallon's cross-examination to suggest a side bar

because, although I thought his questions proper, in

the proper area, I recognized that we might be getting into a situation where the witness, quite honestly, would respond by referring to information attributed to Brendan Dassey, or from Brendan Dassey's case, some of which was shared with the witness.

I didn't think that's where Mr. Fallon meant to be going and I just didn't want, you know, to have an honest answer to an unintended question and create a problem. So, that was the reason for the side bar and what we discussed briefly at side bar.

THE COURT: All right.

ATTORNEY FALLON: That's accurate. All I wanted to know was the base of information upon which he was operating. And I'm comfortable with his not mentioning whatever information they obtained from him because it's not germane to the rest of my examination.

THE COURT: Very well, we'll bring the jurors back in at this time.

(Jury present.)

THE COURT: You may be seated. And, Mr. Fallon, you may resume.

ATTORNEY FALLON: Thank you.

- 1 Q. (By Attorney Fallon)~ Doctor, as I understand,
- when we left off, you were telling us about the
- 3 information that you had at your disposal to
- 4 assist you in expressing these opinions this
- 5 afternoon. So, let me begin by saying and
- 6 summarizing, you had the two reports from
- 7 Dr. Eisenberg?
- 8 A. That's correct.
- 9 Q. A copy of her transcript from the preliminary
- 10 examination?
- 11 A. That is correct.
- 12 Q. Okay. You had a CD Rom of the -- I would imagine
- fairly numerous amount of photographs taken just
- by Dr. Eisenberg, of all the bone fragments she
- 15 examined?
- 16 A. Yes.
- 17 | O. Maybe not all, but quite a sizable amount of them
- 18 anyway?
- 19 A. Yes, that's correct.
- 20 Q. All right. And you also examined a few pages of
- 21 police reports as I understand it.
- 22 A. That is correct, yes.
- 23 | Q. Now, the police reports you examined, were they
- 24 reports authored by an agent from the Division of
- 25 Criminal Investigation by the name of Tom

- 1 Sturtivant?
- 2 A. I believe so.
- 3 Q. All right. And there were about four pages?
- 4 A. I don't recall the number of pages.
- 5 Q. But it would have been about the initial -- the
- 6 initial discovery -- the reports -- But they were
- 7 brief reports from the officer regarding the
- 8 initial discovery?
- 9 A. I believe so, yes.
- 10 Q. Okay. Now, any other police reports?
- 11 A. I can't think of any offhand.
- 12 Q. All right. Other than the photographs of the
- bone fragments made by Dr. Eisenberg, did you
- obtain any other crime scene photographs?
- 15 A. Yes, I did.
- 16 Q. Okay. Tell us about the crime scene photographs
- 17 that you received?
- 18 A. Various views of the Avery property.
- 19 | O. Aerial views?
- 20 A. Aerial views.
- 21 Q. Okay.
- 22 A. Landscape views, so down, obviously taken by
- 23 somebody on the ground, various different angles;
- exteriors views of dwellings; distant views of
- 25 the pit behind the garage, general area photos as

- 1 well.
- 2 Q. All right. How about any of the photographs
- 3 obtained prior to the processing of the pit,
- 4 developed by the Wisconsin State Patrol on Sunday
- or Monday, that would be November 6th or 7th, the
- days before the pit was discovered on the 8th?
- 7 A. I believe there were some, as I recall.
- 8 Q. Some?
- 9 A. Yeah, I'm trying to picture the images in my
- 10 mind, but I do believe I received those.
- 11 Q. Did you receive any photographs regarding the
- 12 processing of the pit by Special Agents Pevytoe,
- 13 Sielehr and Rindt, occurring on Thursday the
- 14 10th?
- 15 A. Not to my recollection.
- 16 Q. Okay. So you did not see any photographs showing
- 17 the pit covered in a blue tarp?
- 18 A. I do recall a photograph with a blue tarp over
- 19 it.
- 20 Q. A blue tarp over it. And how many of those
- 21 | photographs do you recall? There were three
- 22 rolls of prints.
- 23 A. I can't recall, specifically.
- 24 Q. All right. Counsel has provided me some
- information, so let's take a look.

- 1 ATTORNEY FALLON: If I may approach the
- 2 witness, Judge.
- THE COURT: Go ahead.
- 4 ATTORNEY FALLON: Thank you.
- 5 Q. (By Attorney Fallon)~ I'm showing you what has
- 6 been marked, at least on the information provided
- 7 by counsel, as roll four; does that look like a
- 8 series of photographs that you are familiar with?
- 9 A. Yes, it does. Yes.
- 10 Q. Great. All right. How about another stack of
- photographs, looks like D-16, 1 through 23, take
- 12 a quick look at those.
- 13 A. Yes, I do recall these.
- 14 Q. Okay. Great. And D-14, 1 through 28?
- 15 A. I recall some of the photos within this.
- 16 Q. Some, but you did not see all of them?
- 17 | A. I cannot state with any certainty that I recall
- 18 seeing all of them.
- 19 Q. One last look here, if you would be so kind,
- 20 D-15, 1 through 24.
- 21 A. Yes, I do recall these.
- 22 Q. All right. And you have seen those photographs?
- 23 A. Yes, I do recall those.
- 24 Q. As well as the photographs provided to you that
- 25 were taken by Dr. Eisenberg?

- 1 A. Yes.
- 2 Q. Okay. Any other law enforcement reports, did you
- 3 have the opportunity to examine?
- 4 A. There was a compiled report that was a
- 5 computerized simulation of the scene.
- 6 Q. All right.
- 7 A. And I did have access to that document in
- 8 computerized form.
- 9 Q. That would have been an overview animation by
- 10 Trooper Austin?
- 11 A. Yes, that's correct.
- 12 Q. Now, with respect to the photographs that you
- have seen there, did you have all of the reports
- 14 which were generated in conjunction with those
- 15 photographs?
- 16 A. I don't know for a certainty that I had all
- 17 reports.
- 18 Q. All right. Do you know when those photographs --
- 19 what day those photographs were taken, from the
- 20 information you were provided?
- 21 A. I don't recall.
- 22 Q. All right. When were you first asked to assist
- 23 in reviewing this information on behalf of the
- 24 defense?
- 25 A. I believe it was November, early November of

- 1 2006.
- 2 Q. All right.
- 3 A. If I recall.
- 4 Q. And in this particular case, you did not issue a
- 5 report of your findings, correct?
- 6 A. No, I did not.
- 7 Q. You were not asked to write one, I take it?
- 8 A. That's correct.
- 9 Q. All right. In the cases that you have testified
- 10 for the Crown, you usually write a report, do you
- 11 not?
- 12 A. I do.
- 13 Q. As a matter of fact, I suspect that's probably
- 14 required.
- 15 A. Oh, yes, absolutely.
- 16 Q. And that's so that when the gentleman who happens
- 17 to be on the other side of the prosecution by the
- 18 | Crown, so that they would have fair notice of
- 19 exactly what opinions you were going to express
- 20 so they would know what they were?
- 21 A. Yes.
- 22 Q. Okay. By the way, while we're at that, when you
- work for the Crown, generally you have access to
- all of the information that the officers generate
- 25 to assist you in formulating the opinions that go

- 1 into that report; isn't that right?
- 2 A. I do have access, yes.
- 3 Q. And I would hazard a guess that it's probably
- 4 pretty routine practice that you would review all
- 5 that information before putting your report
- 6 together as the consulting forensic
- 7 anthropologist?
- 8 A. Correct.
- 9 Q. And that is because forensic means of, by, or
- 10 pertaining to a court; that's right?
- 11 A. A legal context.
- 12 O. Right. So, in other words, it's taking your
- field of biological anthropology, your specialty,
- and kind of merging those principles with the
- principles of the law, to formulate an opinion
- and express it in a court of law?
- 17 A. Yes.
- 18 | Q. Okay. Very good. Let's talk a little bit about
- 19 your experience, a little more detail. You would
- agree, would you not, that no two crime scenes
- 21 are alike?
- 22 A. I would indeed.
- 23 | Q. As a matter of fact, each crime scene presents a
- host of different issues and problems that need
- 25 to be addressed and resolved by those

- 1 investigating what's before them?
- 2 A. Yes.
- 3 Q. And as such, there is a certain amount of
- 4 professional judgment that needs to be exercised
- 5 to perform your duties, which takes into account
- 6 these varying conditions?
- 7 A. Yes.
- 8 Q. And while you may have a standard operating
- 9 practice or procedure, sometimes that procedure
- 10 has to be modified from time to time, given
- 11 whatever you find at a location?
- 12 A. I would accept that.
- 13 Q. In fact, not every location can be processed with
- a grid format or a forensic mapping format, can
- 15 they?
- 16 A. I don't know if that's true.
- 17 Q. Well, have you been to any disaster locations or
- 18 sites?
- 19 A. Yes.
- 20 Q. Not all of them are forensically mapped or
- 21 gridded, are they?
- 22 A. The ones I have been involved with they have had
- a form of grid put in.
- 24 Q. But you can't say that that necessarily occurs in
- 25 all cases?

- 1 A. No, I cannot state that. That's correct.
- 2 Q. All right. And there may very well be good
- 3 reasons to depart from standard protocol and
- 4 procedures when processing a scene?
- 5 A. I would accept that.
- 6 Q. And I would imagine in your neck of the woods in
- 7 northern Ontario, weather is a pretty important
- 8 factor in processing scenes, especially this time
- 9 of year?
- 10 A. Absolutely.
- 11 Q. That might be one of the reasons that you might
- depart from a certain set of procedures, to
- 13 account for that?
- 14 A. I have yet to do so. I have done winter
- 15 recoveries in cremains cases and have not
- deviated from the protocols that I have been
- 17 using.
- 18 | Q. But you can imagine a situation where that is
- 19 likely to occur?
- 20 A. I suppose.
- 21 | Q. Sure. All right. I would like to talk a little
- 22 bit about fires. In your work, as I understand
- 23 it, and maybe this is a good way to get into it,
- 24 you specialize in studying cremations?
- 25 A. Cremated remains.

- 1 Q. Cremated remains. Now, are those cremated
- 2 remains, are those the kind that we're talking
- about in crematoriums, or do you use the word
- 4 cremated remains in a more natural consequence?
- 5 A. A more natural consequence.
- 6 Q. All right.
- 7 A. Not commercial cremations.
- 8 Q. Not commercial cremations. Are you familiar with
- 9 commercial cremations?
- 10 A. Yes, I am.
- 11 Q. All right. And while we're at that, would it be
- fair to say that it takes about 3 million BTUs to
- cremate a human body?
- 14 A. 3 million?
- 15 Q. Yeah.
- 16 A. I wouldn't know that, specifically.
- 17 | Q. You wouldn't know.
- 18 A. My knowledge is with time and temperature.
- 19 Q. Time and temperature.
- 20 A. Correct.
- 21 | Q. All right. Then the average temperature to
- 22 cremate remains varies somewhere between 1600 and
- 23 | 1800 degrees, anywhere from an hour and a half to
- two and a half hours? That sounds about right?
- 25 A. I take it the degrees are in Fahrenheit?

- 1 Q. Correct.
- 2 A. Yes, that would be correct.
- 3 Q. That's right, I forget, you guys use Celsius.
- 4 A. Right.
- 5 Q. You are not going to make me convert centigrade
- 6 to Fahrenheit, are you?
- 7 A. That's --
- 8 Q. Because I'm a lawyer, I can't do that.
- 9 A. I will do my best to convert my numbers.
- 10 Q. We might need a translator yet. All right. And
- while we're at it, a BTU is a British Thermal
- 12 Unit?
- 13 A. Yes.
- 14 Q. And would you accept the general proposition that
- one BT is the -- BTU is the amount of energy to
- raise the temperature of water one degree from 59
- 17 1/2 degrees Fahrenheit to about 60 1/2 degrees
- 18 Fahrenheit?
- 19 A. I believe that's the definition.
- 20 Q. All right. And actually --
- 21 ATTORNEY STRANG: We would need a volume of
- 22 water for BTU.
- 23 ATTORNEY FALLON: Liter of water, excuse
- 24 me, you're right.
- 25 A. Yes.

- 1 Q. (By Attorney Fallon)~ And a BTU is a means of
- 2 measuring energy, right?
- 3 A. Yes, it is.
- 4 Q. All right. Now, when you are looking at cremated
- 5 remains in nature, one of the things that you
- 6 would ask yourself, as a forensic anthropologist,
- you would want to know what the fuel load was;
- 8 you might be interested in how such a fire was
- 9 created?
- 10 A. The type of fuel, yes.
- 11 Q. Right. And we have at least four basic types of
- fuel, do we not? We have a liquid form of fuel?
- 13 A. Yes, liquid. Solids.
- 14 O. We have solids?
- 15 A. Gaseous.
- 16 Q. We have gas or vapor?
- 17 A. Yes.
- 18 Q. And we have aerosols and even dust?
- 19 A. Yes.
- 20 Q. Right?
- 21 A. That's correct.
- 22 Q. In fact, some powders, even wheat flour can
- 23 somehow be exploded?
- 24 A. Yes.
- 25 Q. Okay. So you would agree, that in terms of

- determining the probability of burning human
- 2 remains at nature, depends in large part on the
- fuel load, and more importantly, the exposure of
- 4 the body to the heat itself?
- 5 A. That's correct.
- 6 Q. As a matter of fact, in terms of the exposure of
- 7 the body to the heat, the more surface area which
- is exposed to the heat, the quicker and faster
- 9 the remains will reach that cremated state,
- 10 correct?
- 11 A. That is correct.
- 12 Q. So the bottom line is, whenever you are looking
- at that, what you want to do is try to assess, is
- 14 how long the parts of the body were expursed --
- were exposed to a certain temperature?
- 16 A. Yes.
- 17 | O. All right. And it's not so much the flame, by
- 18 the way, that we're worried about, it's the
- 19 exposure to the heat --
- 20 A. Yes.
- 21 | Q. -- generated by the flame?
- 22 A. Yes.
- 23 | Q. Now, we have a variety of solid fuels that are
- 24 commonly used to burn, most notably, wood seems
- 25 to be the most common, correct?

- 1 A. Certainly.
- 2 Q. All right. And would you disagree with me if I
- were to tell you that per pound of wood would
- 4 generate about 5,000 BTUs?
- 5 A. I have no basis to disagree with that.
- 6 Q. All right. And that a pound of coal would
- generate, roughly, about 12,000 BTUs?
- 8 A. That sounds about right.
- 9 Q. And oil would be about 16,000 BTU?
- 10 A. Yeah, 16. Yeah.
- 11 Q. All right. Now, one of the things that could be
- used for a fuel would be a tire, correct?
- 13 A. Absolutely.
- 14 Q. And as a matter of fact, a tire generates
- anywhere from about 14,000 BTU to 16,000 BTU per
- 16 passenger tire?
- 17 A. Yes.
- 18 Q. And it's 14 to 16 because, if you shred the tire,
- 19 you are likely to end up with about 16,000 BTUs
- of energy per pound of tire?
- 21 A. That would be right.
- 22 | 0. And the reason that happens is because there is
- 23 more surface area of the tire which is exposed,
- and thus generating more heat?
- 25 A. Precisely.

- 1 Q. The average passenger tire is about 20 pounds,
- 2 right?
- 3 A. Thereabouts, yeah, I would agree.
- 4 Q. All right. So, then, the average passenger tire
- 5 would generate anywhere from about 280,000 to
- 6 300,000 BTUs of energy?
- 7 A. I would accept that.
- 8 Q. And tires are a pretty good source of fuel
- 9 because they burn consistently and they burn very
- 10 hot?
- 11 | A. Oh, yes.
- 12 Q. They generate a great deal of heat?
- 13 A. I agree.
- 14 Q. And, as a matter of fact, you would expect to see
- a very large flame pile from one burning tires,
- 16 | correct?
- 17 A. Flame pile?
- 18 Q. Flame, a high flame.
- 19 A. Oh, a high flame, yes.
- 20 Q. All right. And they would generate a great deal
- 21 of heat?
- 22 A. Yes.
- 23 Q. Okay. Now, before a body can be cremated,
- 24 whether it's in the crematorium or in the wild,
- as it were, the body first has to be heated to a

- 1 significant degree or temperature, correct?
- 2 A. Yes, that would be correct.
- 3 Q. All right. As a matter of fact, you have to, for
- 4 all intents and purposes, you have to dehydrate
- 5 that body first?
- 6 A. The process begins with, obviously, the exterior
- of the body. And heating things such as hair,
- 8 for example, would be the first area that is
- 9 lost, if there is no clothing.
- 10 Q. And as you heat the body, it begins to dehydrate.
- And after a particular point in time, the body
- itself, the remains become actually more fuel for
- 13 the fire?
- 14 A. Once you get through the skin, it becomes more
- fuel, the fats of the body do serve as a fuel for
- 16 the fire, that is correct.
- 17 Q. As a matter of fact, back in days of antiquity,
- 18 when they had funeral pyres, they would often
- 19 smear the bodies with animal fat to assist in
- 20 creating the funeral pyre?
- 21 A. In order to get the ignition, yes.
- 22 O. Now --
- 23 ATTORNEY FALLON: What time -- do you want
- 24 to take a break?
- 25 THE COURT: If you are at a logical break

in the questioning, I think that's a good idea. 1 ATTORNEY FALLON: Sure. 2 3 THE COURT: All right. Members of the jury, we're going to take our afternoon break at 4 5 this time. I will remind you not to discuss the case during the break. You are excused at this 7 time. (Jury not present.) 8 9 THE COURT: You may be seated. Counsel, I 10 would like to see you briefly in chambers, now, at the start of the break. 11 12 ATTORNEY FALLON: Okay. 13 (Recess taken.) 14 (Jury present.) 15 THE COURT: Mr. Fallon, you may resume. 16 ATTORNEY FALLON: Thank you, Judge. 17 CROSS-EXAMINATION CONTD. 18 BY ATTORNEY FALLON: Doctor, I would like to finish up our discussion 19 0. 20 of the burning human remains in the natural 21 setting. You would agree, would you not, that 22 there are several variables that are at play in 23 trying to decide how a body was burned and how 24 long it would have taken and things of that

nature, correct?

- 1 A. Yes, I would agree.
- 2 Q. All right. For instance, you would want to know
- 3 the type and the amount of the fuel?
- 4 A. Yes, that would be important.
- 5 Q. And you would certainly want to know what the
- 6 weather conditions were, correct?
- 7 A. That would have an influence.
- 8 | O. That would have an influence. You would want to
- 9 certainly know what the ratio is of the fuel
- 10 mixture to the -- what is the item being burned?
- 11 A. If possible.
- 12 Q. And very importantly you would want to know the
- extent to which the body was exposed to the heat
- 14 generated by the fuel?
- 15 A. Yes.
- 16 Q. Now, you would agree, would you not, that an
- 17 unattended -- we will use the term "funeral
- 18 pyre".
- 19 A. All right.
- 20 Q. Given all other variables being the same, but an
- 21 unattended funeral pyre would burn at a slower
- 22 rate than an attended one?
- 23 A. In general, yes.
- 24 Q. Because one -- an attended one, presumably the
- 25 person who is conducting the fire, or managing

- 1 the fire, that's probably a better word, would be
- 2 able to make sure that the fuel load is
- 3 adequately distributed to all parts of the fire?
- 4 A. Yes.
- 5 Q. All right. And, as a matter of fact, if the
- 6 attending person wanted to make sure that the
- 7 human remains were fully exposed to the heat,
- 8 there may be some dismembering, correct?
- 9 A. Dismembering in what sense?
- 10 Q. Well, if you were to -- if you were to -- Let's
- 11 put it right on the table. If you were to chop
- 12 up human remains, there would be more surface
- area exposed to the heat?
- 14 A. Yes, I would accept that.
- 15 Q. All right. And, as a matter of fact, if that was
- occurring, then the remains would be consumed
- more quickly than if you had just left a body in
- 18 toto, laying on a funeral pyre?
- 19 A. Yes, I would agree.
- 20 Q. All right. I want to go back and visit the
- 21 testimony that you discussed with counsel
- 22 regarding the burn pit as being the potential, or
- 23 possible, area of initial or original burn, and
- 24 talk also about the impact, or no impact, of the
- 25 burn barrel.

- 1 A. Okay.
- 2 Q. Just so we're oriented.
- 3 | A. Sure.
- Q. Perhaps the best place to begin is, I think we have an agreement, that for the minutest form of human bone, which has been subjected to a great deal of heat, professional training, in all likelihood, would be required to identify those
- 9 items?
- 10 A. I would agree.
- 11 Q. In fact, there are certain bits of human remains
 12 which are so small they could actually be the
- will are so small energedata accadily se ene
- quarter -- quarter -- one quarter of a finger
- nail, might be just that much of a sliver of a
- bone that could be -- that the remains are
- 16 present for?
- 17 A. Yes.
- 18 Q. And to the average person, and that includes all
- of us here, with the exception of yourself I
- 20 would imagine, the chances of us being able to
- 21 recognize an item that small as part of a human
- 22 anatomy are about slim to none?
- 23 A. That sounds reasonable.
- Q. And you are aware that the vast majority of human remains, fragmented human remains of that size,

- were recovered from the burn pit area, correct?
- 2 A. Yes.
- 3 Q. And you are also aware, are you not, that various
- 4 articles of clothing were recovered from that
- 5 burn pit as well, correct?
- 6 A. Yes.
- 7 Q. All right. You are aware that there were some
- 8 rivets that looked like they went to a pair of
- 9 blue jeans?
- 10 A. Yes.
- 11 Q. A zipper?
- 12 A. Yes.
- 13 Q. All right. And all of those were recovered from
- the burn pit and from no other location that you
- are aware of?
- 16 A. To my knowledge, that's correct.
- 17 Q. All right. And just so that I'm clear, it's your
- 18 understanding that, clearly, the -- some bones
- 19 had to have been moved because we have human
- 20 remains not only in the burn pit, but we have
- 21 them in this burn barrel a couple hundred feet
- 22 away?
- 23 | A. Yes.
- 24 Q. All right. So you would agree that the only real
- explanation for that to have happened is human

- 1 agency?
- 2 A. I would agree.
- 3 Q. In other words, a person had to have taken them
- 4 from one place and put them in another?
- 5 A. Yes.
- 6 Q. And in terms of the burn barrel, you are aware
- 7 that there was no articles of clothing found from
- 8 that particular burn barrel; there were no
- 9 rivets?
- 10 A. That's my understanding.
- 11 Q. No grommets from shoes?
- 12 A. That's correct.
- 13 Q. No zippers?
- 14 A. That's correct.
- 15 Q. And most of the bone fragments were of -- well,
- they were of a larger variety than those
- 17 recovered from the pit itself?
- 18 | A. Yes.
- 19 Q. Right?
- 20 A. Right.
- 21 Q. Okay. Now, one thing, if you could clear up for
- me, I'm not sure, did you say that the bones in
- 23 the barrel had a greater degree of burned affect,
- or was it the burns (sic) in the pit, which was
- 25 it?

- 1 A. I believe it was the burns -- the bones in the
- pit appeared to have a greater -- a longer stage,
- 3 shall we say.
- 4 Q. A longer exposure, as it were, to the heat.
- 5 A. Yes.
- 6 Q. In other words, they showed greater
- 7 fragmentation?
- 8 A. Greater heat condition -- damage, yeah.
- 9 Q. Right.
- 10 A. Yeah.
- 11 Q. Which may very well account for the fact that we
- have all of the really microscopic and very, very
- small fragment of bone recovered from the pit;
- 14 that would certainly be consistent, right?
- 15 A. I can't deny that.
- 16 Q. Okay. Now, as I understand your testimony, it's
- 17 clear to you that the remains that were recovered
- 18 here, most of which came from the burn pit, are
- 19 the remains of an adult female?
- 20 A. Yes.
- 21 Q. And you do not take any issue with the fact that
- there is clear evidence of at least two qunshot
- to the cranial pieces, which were able to be
- 24 recovered?
- 25 A. That's correct.

- 1 Q. And you would agree, would you not, that they are
- 2 entrance defects, correct?
- 3 A. Yes.
- 4 Q. And that's because the beveling, which is
- 5 present, is on the outside of the -- in other
- 6 words, the entrance area, correct?
- 7 A. No, that is not correct.
- 8 | O. It's on the inside?
- 9 A. It's on the inside.
- 10 Q. And if they were exit wounds where would the
- 11 beveling be?
- 12 A. On the exterior.
- 13 | O. On the exterior?
- 14 A. Right.
- 15 Q. And in your opinion -- Well, let's digress
- 16 momentarily. You had some question regarding
- cause of death and manner of death, let's just --
- the only matter at issue here is manner of death.
- 19 Now, in the remains that you observed here, you
- 20 would agree, would you not, Doctor, that there
- 21 would be no point in attempting an autopsy?
- 22 A. Not in the traditional sense, no.
- 23 | Q. There's certainly not enough tissue, in fact
- 24 there's no tissue left to examine?
- 25 A. I understood there to be some tissue recovered.

- 1 Q. Some tissue?
- 2 A. Some tissue, however charred.
- 3 Q. However charred. Which some DNA analysis was
- 4 undertaken; are you aware of that?
- 5 A. Yes, that's my understanding.
- 6 Q. But, by and large, that's really the only piece
- 7 of mushel -- muscle tissue that was recovered?
- 8 A. Yes.
- 9 Q. And that alone, certainly would not be enough for
- one to conduct an autopsy in the traditional
- 11 sense, correct?
- 12 A. That is correct.
- 13 Q. All right. And you would agree, as an
- anthropologist, whether you have an
- archaeological perspective, or even a biological
- 16 perspective, that examining bones in the
- 17 condition in which these were found is, in large
- 18 part, almost strictly the purview of a forensic
- 19 anthropologist?
- 20 A. We are best to quantify and examine the cremains,
- 21 certainly for the traditional areas that forensic
- 22 anthropology deals with.
- 23 | Q. And you certainly wouldn't disagree with the fact
- 24 that what you have is an individual who was
- 25 murdered, would you?

- 1 A. I don't know that to be true or not.
- 2 Q. Well, you wouldn't disagree with that as a
- 3 logical conclusion to be drawn from the evidence
- 4 provided, would you? I mean, she didn't jump in
- 5 the fire herself?
- 6 A. No. No. I would agree with that.
- 7 O. And certainly didn't shoot herself in the head
- 8 twice, right? That would be pretty hard to do.
- 9 A. It may surprise you to know that I know that it's
- 10 been done, but.
- 11 Q. How many times have you seen that done, Doc?
- 12 A. One.
- 13 Q. All right. Out of how many thousands of cases?
- 14 A. Yeah, exactly.
- 15 Q. All right. Now, you can't say, to a reasonable
- 16 degree of scientific certainty, that that burn
- pit was not the original place of the burning,
- 18 can you?
- 19 A. That's correct.
- 20 Q. I would like you to tell me just what evidence
- 21 you have that the body could have been burned in
- the burn barrel?
- 23 A. I have none to support it.
- 24 Q. Absolutely none, right?
- 25 A. That's correct.

- Q. In fact, the greater weight of the evidence,
 which is presented to you, would show that that
 barrel, in all likelihood, was not the location
 of the original burning?
- 5 A. I can't say one way or the other.
- Q. Well, a typical 55 gallon drum, in which it
 certainly would be difficult to put an adult
 female of approximately 5 foot 6 in stature, and
 stuff her into a barrel and burn her; that
 wouldn't be the easiest of things to do, right?
- 11 A. I wouldn't imagine it being easy, no.
- Q. And a matter of fact, it would be -- it would take -- you would have to agree, it would take far longer time to actually reduce a human being to the level of which you found the bones in the burn pit? It would take a lot longer to do that in a burn barrel?
- 18 A. Not necessarily.
- Q. There is not enough exposure. You would have to -- you would have to expose that body to a great deal of heat, correct?
- 22 A. You would, yes.
- Q. All right. And it would be certainly really difficult to put in a lot of tires and high burning accelerants in that particular barrel,

- 1 correct?
- 2 A. A large number of tires would be very difficult,
- yes.
- 4 O. Nor can you say, Doctor, that the boiler on the
- 5 property was the place where the original burning
- 6 occurred, can you?
- 7 A. That's correct.
- 8 Q. And you can't say that the smelter is the place
- 9 of the original burning, correct?
- 10 A. That is correct.
- 11 | Q. Now, you had photographs of those items, right?
- 12 A. That's correct.
- 13 Q. And you looked at the cellulose ash which was
- recovered from the wood burner boiler, right?
- 15 A. Yes.
- 16 Q. That ash is entirely inconsistent with the type
- of ash and debris which was recovered from the
- 18 pit, correct?
- 19 A. From what I recall, yes.
- 20 Q. All right. And in your -- And your review of
- 21 strictly the photographs of the smelter, there
- was no ash, or charring, or anything inside the
- 23 smelter, right?
- 24 A. That's correct.
- 25 | Q. That you could see?

- 1 A. That I could see, that's correct.
- 2 Q. So, we certainly can't say that the smelter was
- 3 the place where the remains were burned, right?
- 4 A. Not to my knowledge, no.
- 5 Q. All right. By the way, are you familiar with a
- 6 process called board certification?
- 7 A. Yes, I am.
- 8 | O. And what is that?
- 9 A. It's -- Board certification for forensic
- anthropologists is the American Board of Forensic
- 11 Anthropology.
- 12 Q. You have not yet pursued that certification; is
- 13 that right?
- 14 A. That is correct.
- 15 Q. Okay. All right. Oh, one more thing, Doc, you
- 16 | never looked at the bones in this case, did you?
- 17 A. I did not.
- 18 | 0. Thanks.
- 19 A. Thank you.
- THE COURT: Mr. Strang, any redirect?
- 21 ATTORNEY STRANG: I do, thank you.
- 22 REDIRECT EXAMINATION
- 23 BY ATTORNEY STRANG:
- Q. Dr. Fairgrieve, you were asked a number of
- questions about what it is that you had to look

- 1 at?
- 2 A. Yes.
- 3 Q. Was there anything at all that you asked Mr.
- 4 Buting or me for that we declined to give you?
- 5 A. Not to my knowledge. I don't recall that there
- 6 was anything denied that I was asked for.
- 7 Q. And anything you thought you needed that you
- 8 asked us for and we said we had but wouldn't give
- 9 you or that we didn't have, for that matter?
- 10 A. No, I don't believe so.
- 11 Q. Is there any evidence at all that you have seen,
- in all of the photographs you have looked and
- Dr. Eisenberg's two reports or in her testimony,
- 14 that the body you have seen here was dismembered
- in any way, before burning?
- 16 A. Prior to burning, no.
- 17 Q. Had tires, rubber tire, car tires, some sort of
- 18 tire, been used as a fuel to burn this body,
- 19 | would you have expected a burnt rubber residue
- 20 sort of smell on at least some of the bone
- 21 fragments?
- 22 A. I have encountered that myself, in
- 23 experimentation.
- 24 Q. Is it a pungent or a strong smell?
- 25 A. When you are close to the bones, it can be

- 1 strong.
- 2 Q. And when you say you have encountered that
- 3 yourself in experimentation --
- 4 A. Yes.
- 5 Q. -- perhaps you can tell us what that is.
- 6 A. Part of the research that I undertake is to do
- 7 test burns. And we utilize, for these purposes,
- 8 pig carcasses, of varying sizes, to mimic human
- 9 remains. And burning up tires is just one such
- scenario of consuming the flesh.
- 11 Q. And as a fuel?
- 12 A. As a fuel, yes.
- 13 Q. Have you done that yourself?
- 14 A. Yes, I have.
- 15 Q. And what did you smell with the -- you know, the
- burnt remains of the pig, afterwards?
- 17 A. Quite a pungent odor associated with the remains
- 18 from the actual smell of the rubber.
- 19 Q. Is there any reason at all -- No, let me back up,
- 20 because I want to be clear. You are not here to
- 21 tell us that you can say any particular site is
- the burn site in this case?
- 23 A. That's correct.
- 24 Q. Okay. Neither are you able to rule out or
- exclude any possible burn site, if I understood

- 1 you?
- 2 A. That's correct.
- 3 Q. What you have told us is, that in your
- 4 experience, you find the majority of bones
- 5 usually in the place to which bones are moved,
- 6 not the place from which they are moved.
- 7 A. Yes, that's accurate.
- 8 | O. Including smaller or more delicate bones?
- 9 A. Yes, I have found that to be the case.
- 10 Q. In your experience, do you have any reason to
- 11 think that a dead human body could not be put in
- a 55 gallon drum or burn barrel?
- 13 A. No, I see no reason why it couldn't.
- 14 Q. Do you have any idea at all here, in the end,
- where clothing fragments, whether that's fabric
- or metal items, or grommets from clothing, were
- 17 recovered?
- 18 A. From other locations?
- 19 Q. Do you have any idea where -- where the police
- 20 may have found remnants, or possible remnants of
- 21 clothing?
- 22 A. From what I understood, it was from the actual
- 23 burn barrel. The pit behind the Avery garage.
- 24 Q. Okay. You don't know whether fragments were
- 25 found elsewhere?

- 1 A. Not to my knowledge.
- 2 Q. Neither do you know whether they were missed
- 3 elsewhere?
- 4 A. Definitely not.
- 5 Q. You spoke of the -- on the average, of the
- fragments in the burn barrel being larger than,
- on the average, the fragments in the burn area --
- 8 A. Yes.
- 9 Q. -- behind the garage? What were the largest
- fragments you saw of bone here, regardless where
- 11 found?
- 12 A. As I recall, I believe it was the cranial
- 13 fragments.
- 14 Q. And about how big were those?
- 15 A. Oh, I would say, looked like about an inch and a
- 16 half in diameter.
- 17 | O. Okay.
- 18 A. Something on that order.
- 19 Q. So when we're talking about large and small --
- 20 A. Yeah.
- 21 | Q. -- as I understand, everything here is about an
- inch and a half on down, to smaller than that?
- 23 A. From what I recall, yes.
- 24 Q. Is a barrel something in which burnt human
- remains might be moved and then, you know, turned

- 1 over or dumped elsewhere?
- 2 A. Oh, sure.
- 3 ATTORNEY STRANG: That's all I have. Thank
- 4 you.
- 5 THE COURT: Mr. Fallon, anything else?
- 6 ATTORNEY FALLON: About three questions.

7 RECROSS-EXAMINATION

- 8 BY ATTORNEY FALLON:
- 9 Q. The smell that one might, on occasion, find from
- 10 human remains subjected to a fire involving
- 11 rubber, that smell would dissipate over time,
- 12 right?
- 13 A. It is possible, yes.
- 14 Q. As a matter of fact, it would certainly be
- subject to the elements of weather, would it not?
- 16 A. I agree.
- 17 Q. And that would certainly help dissipate the
- 18 | smell?
- 19 A. That's possible, yes.
- 20 Q. As a matter of fact, the greater degree of
- 21 charring and calcination the less likelihood you
- are going to have that kind of smell, because
- 23 there's not much for it to attach it to, right?
- 24 A. That is correct.
- 25 Q. I lost my train of thought. If I may have one

1	moment.
2	ATTORNEY FALLON: I'm afraid you're lucky,
3	Doc, I lost that train of thought. I'm done.
4	THE COURT: Mr. Strang, anything else?
5	ATTORNEY STRANG: No, thanks.
6	THE COURT: Very well, you are excused.
7	Mr. Strang.
8	ATTORNEY STRANG: What I would propose to
9	do at the moment is simply to read a stipulation to
10	which both Mr. Avery and the State have agreed, as I
11	understand it.
12	THE COURT: Is that correct, counsel?
13	ATTORNEY KRATZ: Yes, that's fine, Judge.
14	THE COURT: All right. You may do so.
15	ATTORNEY STRANG: Ladies and gentlemen, the
16	parties agree that, on October 31, 2005, Steven
17	Avery spoke twice with Jodi Stachowski, his
18	girlfriend, on his cordless land telephone line.
19	Each conversation was about
20	THE COURT: Just a second, Mr. Strang, I
21	don't think number seven is working any more. So
22	you may want to use the
23	ATTORNEY STRANG: The trial is over when
24	the electronics die? Do I need to start over?
25	THE COURT: I think that would be best.

Τ	ATTORNEY STRANG: All right. The
2	stipulation reads as follows: The parties agree
3	that, on October 31, 2005, Steven Avery spoke twice
4	with Jodi Stachowski, his girlfriend, on his
5	cordless land telephone line. Each conversation was
6	about 15 minutes. The first began at 5:36 p.m. and
7	the second began at 8:57 p.m.
8	THE COURT: And, Mr. Kratz, is the State
9	joining in that stipulation.
10	ATTORNEY KRATZ: It certainly is, Judge.
11	THE COURT: Very well. We'll receive the
12	stipulation. Mr. Kratz or Mr. Strang, excuse me.
13	ATTORNEY STRANG: Next defense witness,
14	briefly, is Investigator Mark Wiegert.
15	THE COURT: Very well.
16	INVESTIGATOR MARK WIEGERT, called as a
17	witness herein, having been first duly sworn, was
18	examined and testified as follows:
19	THE CLERK: Please be seated. Please state
20	your name and spell your last name for the record.
21	THE WITNESS: Mark Wiegert, W-i-e-g-e-r-t.
22	DIRECT EXAMINATION
23	BY ATTORNEY STRANG:
24	Q. Good afternoon, again, Mr. Wiegert.
25	A. Good afternoon.

- 1 Q. I think you probably were here in the courtroom
- with us when a young woman named Lisa Buchner
- 3 testified yesterday?
- 4 A. Yes, sir.
- 5 Q. Had you interviewed her previously?
- 6 A. Yes, I remember the interview very well.
- 7 Q. Was that -- Did the interview take place on
- 8 Monday, November 7, 2005?
- 9 A. It did, yes.
- 10 Q. All right. And among other things, did Ms
- Buchner tell you, on Monday, November 7, 2005,
- that she remembered some things on Saturday,
- November 5, and thought it would be important
- that we would know; we, meaning law enforcement,
- 15 would know that information?
- 16 A. Yes, she had basically shown up at the checkpoint
- 17 where we had security up out on Highway 147. And
- 18 I had gotten a call from them stating that
- 19 there's somebody at the checkpoint that had
- 20 information. And that would happen periodically
- 21 throughout the time we were out there.
- 22 And, in fact, we would get a lot of
- 23 phone calls about information as well. But, what
- had happened is, I didn't have any other
- detectives to interview her because they were all

- 1 out doing other interviews, on leads and things
- 2 like that. So I told them to let her through the
- 3 checkpoint. I met her at the Command Post.
- 4 0. On the 7th?
- 5 A. On the 7th.
- 6 Q. Right. Okay. And she -- You interview her and
- 7 she tells you, you know, that she saw a female
- 8 taking pictures around 3:30 p.m. one day?
- 9 A. That's correct.
- 10 Q. And when you are talking to her on Monday,
- November 7, she was able to tell you that this
- observation of a female taking pictures of the
- van happened either on Monday, October 31, or
- 14 Tuesday, November 1, or maybe Wednesday,
- November 2; do I understand that correctly?
- 16 A. That's -- That's what she had told me that day,
- or she did not know what color the van or
- 18 anything was.
- 19 Q. Right. And -- And she could narrow it down only
- 20 to one of those three days, but it was the week
- 21 before she was speaking to you on Monday,
- November 7th?
- 23 | A. That's what she had indicated that day; however,
- she couldn't give me a -- what kind of weather it
- was that day. Nothing else stood out in her mind

that day. She just thought it was between those three days. Again, she didn't know what color

3 the van was or anything.

ATTORNEY STRANG: Okay. That's all I had.

I just wanted to nail down the time. Thank you.

THE COURT: Mr. Kratz.

ATTORNEY KRATZ: Thank you, Judge.

CROSS-EXAMINATION

BY ATTORNEY KRATZ:

- Q. Mr. Wiegert, I'm showing you what's been received as Exhibit No. 86. When you spoke to Ms Buchner early on in this investigation, was she able to explain or describe for you where this woman was seen taking the photographs?
- A. She had indicated, at the time she saw this woman taking photographs, was towards the shop area, if you will, at the intersection of Avery Road, where it meets with the driveway, where you go down to the residences. There's a set of mail boxes there and right in that area.
- Q. I'm going to use my laser pointer, is this the area where Ms Buchner said she saw the person taking those photographs?
- 24 A. That's what she had thought, yes.
- 25 Q. Now, when you got to the Avery Salvage property

- on the 5th, that's the first day that you were at
 the property, we have seen photographs, but
 wasn't the van that Ms Halbach was taking
 pictures of actually down in this area, near
 Mr. Avery's residence?
 - A. Yeah, it was still down there. And that's what other witnesses had told us, too, that it was down there.
- 9 Q. All right. Last question I have for you,
 10 Investigator Wiegert, at least on this point is,
 11 this intersection here, is that the main road or
 12 intersection, if you will, for people coming into
 13 the business property itself?
 - A. Yeah, I think it's actually a town road, I think it's -- from my recollection, I think the town upkeeps that road, so it's actually a traveled roadway that leads down to the salvage yard and that's where people come and go to do their business.
- Q. And, in fact, I think there is one other exhibit
 that may show this a little bit better even,
 Exhibit No. 81, that's been received. I will
 show you and the jurors that intersection; do you
 recognize that?
 - A. I do, yes.

- Q. In fact, this intersection, which shows actually two Command Post vehicles, I'm pointing to those; is that where the law enforcement officers set up their command center?
- 5 A. Yes.

- Q. And isn't it, in fact, true, Investigator
 Wiegert, that this very vehicle I'm pointing to
 here, a Blazer, as well as a Pontiac Grand Prix
 behind it, were vehicles that were for sale at
 the Avery Salvage property when you arrived there
 on the 5th?
- A. Yes. And that would make sense, I mean, if you're going to sell a car, you're going to have it up where people are coming and going.

Wouldn't make sense to have it down --

ATTORNEY STRANG: That's pretty speculative, your Honor, I will object.

THE COURT: The Court will sustain the objection and order that the last part of the answer be stricken.

ATTORNEY KRATZ: That's fine.

Q. (By Attorney Kratz)~ Let's talk about this

Blazer, right here, the red and black Blazer. Ir

fact, did you see photographs earlier, that is,

that that's one of the pictures that Teresa

Halbach took, a photograph of that very Blazer 1 that's depicted in Exhibit 81? 2 That is true, yes. I did see those pictures. 3 Α. 4 The Grand Prix behind it is another photograph Ο. 5 that Ms Halbach took, that is, the Grand Prix for sale directly behind that Blazer as well; is that 7 right? Yes. 8 Α. 9 Ο. And, again, both of these vehicles, at least on 10 the 5th, as you got there, were located in the same intersection that Ms Buchner told you she 11 saw some woman out taking pictures of vehicles; 12 13 is that your understanding? 14 That's true, yes. Α. 15 ATTORNEY KRATZ: All right. That's all I 16 have for cross-examination, Judge. Thank you. 17 THE COURT: Any redirect? 18 REDIRECT EXAMINATION 19 BY ATTORNEY STRANG: 20 So, if Teresa Halbach was taking pictures of a Q. 21 van or some cars up by the shop area that you 22 have described, on October 31, presumably, or November 1 or November 2, that's not a photo you 23 24 could attribute to the call to Auto Trader

earlier on October 31, could you?

- 1 A. I guess I'm not sure what you are asking.
- Q. Well, somebody else would have had to ask her to
- 3 take a photograph up at this end, because that's
- 4 not where the maroon van was, right?
- 5 A. The maroon van was not up there.
- 6 Q. And so if she was taking a picture, she was
- 7 either doing that on her own or because someone
- 8 else asked her.
- 9 A. I don't know that anybody has established that
- she was taking a picture down there.
- 11 | Q. Well, if Ms Buchner is correct, that she saw a
- female photographing a van up at that end of the
- driveway ...
- 14 A. Ms Buchner didn't say who was taking a picture.
- She couldn't even give me a description of who it
- 16 was; she said it was a female.
- 17 | O. Right, I understand.
- 18 A. And didn't know what day it was. So it was
- between a set of days, she thought.
- 20 Q. Did you find any other information that female
- 21 photographers were out taking pictures of cars
- 22 near Avery Road, or that driveway, on any day
- between October 31 and November 2, 2005?
- 24 | ATTORNEY KRATZ: I'm going to object as to
- 25 the characterization, Judge. I don't think you have

to be a professional photographer to take a picture. 1 ATTORNEY STRANG: I'm not suggesting a 2 professional photographer. 3 (By Attorney Strang) ~ Do you have any information 4 Ο. 5 at all, as the case agent, or one of the two lead investigators here, of any female taking 6 7 photographs of a van, or any other car, other than Teresa Halbach, on October 31 to November 2, 8 9 2005, anywhere on that driveway? 10 Α. Where the picture is there? 11 Anywhere on Avery Road or that driveway --Q. 12 Α. The only --13 Ο. -- any information at all? 14 No, I don't. Α. 15 ATTORNEY STRANG: Okay. That's all I have. 16 Thanks. 17 ATTORNEY KRATZ: One other question. 18 **RECROSS-EXAMINATION** 19 BY ATTORNEY KRATZ: 20 But yesterday you heard Ms Buchner say it could Q. 21 have been a week before, or two weeks before. 22 wasn't the 31st, even necessarily anywhere around 23 that time frame; you heard that didn't you? 24 I did hear her say that yesterday, that's Α. 25 correct.

1 ATTORNEY KRATZ: That's all I have got, 2 Judge. 3 THE COURT: All right. The witness is excused. 4 5 ATTORNEY STRANG: Scheduling at side bar? THE COURT: Mr. Strang, any more witnesses 7 today? ATTORNEY STRANG: No, that's why I was 8 9 going to approach side bar; we don't have any more 10 witnesses for today. THE COURT: All right. I will meet with 11 12 counsel after we conclude today. Members of the 13 jury, we're going to break early today, before you 14 leave, I have an announcement to read to you at this 15 time. Some of these things you have heard before. 16 As you know, the Court's decision not to 17 sequester the jury during the trial is dependent 18 on the jurors not listening to, watching, or 19 reading any news accounts of the case, nor 20 discussing it with anyone, including members of 21 your family or other jurors. 22 For these reasons, it is vital that you 23 do not listen to any conversation about the case, 24 do not read any newspaper or internet reports, or

listen to any news reports on the radio or

television, about this trial.

To assure that you are not exposed to any improper media coverage, the Court has ordered that, for the duration of the trial, you do not watch the local news on television; do not listen to the local news on radio; and do not read the newspaper, unless you first have someone remove any articles about the case.

In addition, do not visit any internet websites or web logs, which may include any information about the case, or for that matter, watch any national shows that have any information about the case.

The Court understands that some of you may be working at places of employment during the weekend, do not discuss the case with any employers, employees, or patrons. Do not volunteer your status as a juror to anyone.

If anyone attempts to discuss the case with you, politely but firmly notify them that you are prohibited from discussing the case. If you are involuntarily exposed to information about the case, from any source, take steps immediately to avoid any further exposure.

Should you be exposed to any reports or

communications from any source concerning the case during the trial, or should you become aware of anything you believe may affect your ability to serve as a juror, you should not discuss your concerns with any other jurors, but should report any concerns to the jury bailiff.

As you know, we are getting close to the end of this trial. It is important for the Court to know that each of you has been able to comply with the Court's restrictions on outside information about this case.

Should any of you believe that you have been exposed to any outside information about the case, such as through the news media, or from any other persons, including other family members, or jurors, it is important that you report such information to the Court. You may do so, confidentially, in writing.

I would like each of you to think about that matter during the weekend. The Court may individually question members of the jury before we proceed to the final stages of the trial on Monday, to make sure that no juror has been exposed to any improper outside information about the case. With that, you are excused for today.

1	(Jury not present.)
2	THE COURT: You may be seated. And,
3	counsel, then, I will see you in chambers in a few
4	minutes.
5	ATTORNEY STRANG: Your Honor, before we go
6	off the record, I just want to move Exhibit 501,
7	which is Dr. Fairgrieve's CV.
8	THE COURT: Any objection?
9	ATTORNEY FALLON: None.
10	THE COURT: Exhibit 501 is admitted.
11	(Proceedings concluded.)
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	

1	STATE OF WISCONSIN)
2)ss COUNTY OF MANITOWOC)
3	
4	I, Diane Tesheneck, Official Court
5	Reporter for Circuit Court Branch 1 and the State
6	of Wisconsin, do hereby certify that I reported
7	the foregoing matter and that the foregoing
8	transcript has been carefully prepared by me with
9	my computerized stenographic notes as taken by me
10	in machine shorthand, and by computer-assisted
11	transcription thereafter transcribed, and that it
12	is a true and correct transcript of the
13	proceedings had in said matter to the best of my
14	knowledge and ability.
15	Dated this 2nd day of January, 2008.
16	
17	
18	
19	Diane Tesheneck, RPR Official Court Reporter
20	official coart Reporter
21	
22	
23	
24	
25	

ı	204 [1] 2/24	86 [1] 198/11
100- [1] 15 /17	206 [2] 3/3 3/3	8:57 p.m [1] 195/7
'80s [1] 15/17 '90's [1] 15/14	208 [1] 41/4 223 [2] 38/22 39/19	8th [1] 162/6
'96 [3] 57/23 60/8 102/18	23 [1] 163/11	9
_	24 [1] 163/20	90 [1] 26/21
	247 [5] 46/23 47/15 48/21 51/20	96 [1] 2/6
right [1] 85/20	86/8	9802 [1] 37/11
0	25 [2] 25/3 25/4 26 [1] 60/18	A
05 [2] 1/5 4/2	275 [1] 40/21	A-r-v-i-z-u [1] 5/12
07 [2] 31/20 35/14	28 [1] 163/14	ABD [3] 6/13 6/16 6/17
1	280,000 [1] 174/5	ability [5] 13/21 62/18 121/16
1/2 [2] 170/17 170/17	293 [4] 39/20 47/15 48/21 52/10	206/3 208/14
1/2 [2] 1/0/1/ 1/0/1/ 1/50th [2] 91/5 94/10	2nd [1] 208/15	above [2] 100/9 100/17 absence [2] 97/11 97/13
10 [2] 120/15 131/1	3	absolutely [11] 17/24 34/6 77/15
100 [5] 24/21 47/20 47/24 48/9	3 million [2] 169/12 169/14	77/21 80/15 103/3 136/11 165/15
79/23	30 [2] 121/17 121/24	168/10 173/13 185/24
100 percent [3] 47/22 48/2 99/10	300,000 [1] 174/6	abundance [1] 48/9
103 [1] 2/7 104 [4] 3/2 3/2 3/2 3/2	31 [7] 194/16 195/3 197/13 201/22	Academy [2] 111/6 120/16
105 [1] 2/8	201/25 202/23 203/8 31st [1] 203/22	Academy [2] 111/6 120/16 accelerants [1] 186/25
107 [2] 2/11 2/16	33 [1] 3/2	accept [6] 84/12 167/12 168/5
10th [1] 162/14	35 [2] 121/17 121/25	170/14 174/7 178/14
11 [8] 33/25 34/1 54/9 54/21 55/5	381 [2] 1/5 4/3	acceptability [1] 102/22
57/18 58/1 103/12	3:30 p.m [1] 197/8	acceptable [2] 16/21 19/3
12,000 [1] 173/7 12.5 [1] 25/4	4	accepted [2] 6/23 7/2
12:03 [1] 23/4 12:03 [2] 33/16 33/24	434 [3] 20/19 22/11 63/13	access [3] 164/7 165/23 166/2 accordance [1] 8/9
12:03:08 [1] 31/20	435 [1] 20/9	according [1] 54/16
13 [5] 24/12 25/4 25/11 27/11	436 [1] 73/16	account [3] 167/5 168/13 182/11
49/12	437 [1] 74/18	accounts [2] 129/2 204/19
132 [3] 46/23 47/15 49/6	446 [2] 21/1 32/24	accurate [3] 22/17 159/14 191/7
 133 [1] 51/18 14 [4] 78/2 158/1 163/14 173/18	46 [10] 39/6 40/17 61/9 92/20	acid [11] 70/22 71/5 71/15 71/25
14,000 [1] 173/15	92/20 93/6 94/3 94/7 94/25 101/17	72/11 76/3 81/24 83/10 84/22 85/14 95/14
147 [1] 196/17	47 [7] 40/9 40/17 61/9 93/9 95/7	acknowledgment [1] 38/12
15 [5] 64/6 64/12 156/16 163/20	101/17 101/17	acquired [1] 35/17
195/6	470 [1] 59/19	across [1] 133/12
156 [2] 2/12 2/17 16 [4] 49/12 163/11 173/10 173/18	48 [6] 40/17 41/10 45/12 61/9	active [2] 59/4 110/3
	49 [14] 45/8 45/13 45/14 45/15	actively [2] 29/8 120/5 activity [2] 55/22 114/9
160 [8] 46/22 47/15 47/17 48/21	49/15 49/20 54/9 55/11 57/18	acts [1] 135/15
51/18 52/6 52/9 53/9		actual [32] 18/25 27/8 27/17 27/24
1600 [1] 169/22	499 [4] 3/2 7/7 7/8 105/15	31/13 42/9 44/5 59/6 65/1 79/9
16th [3] 33/16 33/23 69/1	5	86/22 86/25 104/6 108/20 111/18
18 [1] 107/9 1800 [1] 169/23		116/6 122/17 126/20 127/21
189 [2] 2/13 2/18	5,000 [1] 173/4 50 [2] 25/1 55/12	129/23 132/4 132/11 132/24 133/10 133/12 133/15 135/16
194 [2] 2/14 2/19	50 percent [3] 99/12 100/3 100/6	139/19 144/7 153/14 190/18
196 [1] 2/21	500 [5] 3/2 33/18 33/19 33/20	191/22
199 [1] 2/22	105/15	actually [63] 9/21 13/18 15/23
1991 [1] 108/20	501 [4] 3/3 107/6 207/6 207/10	17/7 23/15 27/15 36/25 37/17
1993 [1] 108/14 1997 [1] 74/18	50th [2] 91/5 94/10 55 [2] 186/6 191/12	41/25 44/13 45/15 47/15 49/21 50/1 56/21 60/11 61/4 66/21 69/8
1999 [1] 102/16	59 [1] 170/16	70/13 78/17 86/4 100/16 100/23
1:00 [2] 104/24 105/3	5:07:38 [1] 48/14	101/13 105/13 109/19 111/12
1st [1] 74/18	5:36 p.m [1] 195/6	112/16 116/18 123/7 124/11
2	5:40 [2] 33/16 49/12	124/22 127/8 127/11 127/12 128/2
2,000 [1] 54/18	5:51 [1] 33/24 5th [3] 199/1 200/11 201/10	130/13 130/15 130/17 131/5
2/15/2007 [1] 20/25		131/14 131/21 131/25 132/14 132/16 132/21 133/10 134/24
2/16/07 [2] 31/20 35/14	6	136/2 140/19 141/18 142/22
20 [1] 1/4	60 [1] 170/17	142/24 142/25 170/20 175/12
20 pounds [1] 174/1	65 [1] 2/5	179/12 186/14 199/4 199/14
2002 [1] 109/20 2005 [8] 109/25 144/16 194/16	6th [1] 162/5 —	199/16 200/1
195/3 196/8 196/11 202/23 203/9	7	add [1] 124/21 addition [2] 116/13 205/9
2006 [1] 165/1	7th [4] 162/5 197/4 197/5 197/22	addressed [1] 166/25
2007 [3] 1/8 20/25 57/25	8	adequacy [1] 63/12
2008 [1] 208/15		adequate [3] 22/14 97/10 97/11
202 [1] 2/23	81 [2] 199/22 201/2	adequately [1] 178/3

112/14 112/22 120/16 188/10 Α among [1] 196/10 administration [1] 109/8 amount [11] 26/1 90/14 91/9 139/5 139/5 156/9 160/13 160/17 167/3 170/15 177/3 admitted [4] 3/1 88/12 105/19 207/10 adult [2] 182/19 186/7 analogous [4] 62/17 89/17 89/19 advanced [1] 154/12 89/21 advice [1] 115/12 analogy [1] 62/5 Advisory [2] 111/10 111/16 analysis [28] 11/22 11/23 12/8 **Aerial [2]** 161/19 161/20 18/21 20/22 36/22 42/10 52/20 aerosols [1] 171/18 56/6 65/15 65/18 65/21 69/18 affect [4] 128/13 144/22 181/23 72/25 73/8 73/17 76/3 77/20 89/6 90/23 100/17 107/23 109/15 206/3 afraid [2] 128/15 194/2 110/15 112/9 121/6 122/8 184/3 afternoon [8] 106/13 155/19 analyst [13] 34/18 35/7 35/11 155/20 157/6 160/5 176/4 195/24 35/22 38/6 38/8 38/16 44/19 195/25 46/10 85/16 85/23 86/9 94/4 afterwards [1] 190/16 analysts [1] 83/22 again [30] 4/4 9/4 18/8 25/1 39/22 analytical [26] 6/5 7/17 8/18 9/20 40/1 40/21 41/3 41/6 41/7 45/6 10/8 16/6 19/9 22/2 22/7 27/16 52/24 53/9 64/7 67/4 74/25 75/3 27/17 28/8 55/24 61/23 73/17 77/19 81/21 84/20 85/12 94/8 73/25 74/1 74/2 74/3 74/17 74/21 102/13 104/22 110/19 138/2 146/6 74/22 74/23 84/11 92/10 96/9 195/24 198/2 201/9 analytically [1] 70/13 against [1] 75/14 analyze [2] 19/11 96/15 age [3] 121/12 121/17 121/17 analyzed [5] 29/16 30/22 42/11 agency [1] 181/1 50/8 54/4 agent [2] 160/24 203/5 anatomical [2] 135/10 135/14 **Agents [1]** 162/12 anatomy [3] 109/14 154/13 179/22 aggressive [1] 61/3 ancestry [1] 126/15 angles [1] 161/23 animal [3] 137/9 154/18 175/19 ago [6] 26/20 55/6 57/11 135/24 158/1 158/8 agree [39] 29/18 58/21 71/7 89/25 animation [1] 164/9 121/1 121/3 121/18 121/22 126/2 announcement [1] 204/14 126/5 126/14 126/14 128/14 134/6 another [23] 9/14 9/16 19/5 36/17 134/9 134/15 136/13 138/17 37/12 37/15 40/2 41/6 45/6 97/17 138/21 148/6 166/20 171/25 174/3 119/23 119/24 122/4 139/18 174/13 176/21 177/1 177/16 139/22 142/2 148/13 148/18 178/19 179/10 180/24 181/2 183/1 148/24 153/16 163/10 181/4 201/4 183/20 184/13 185/6 186/13 answer [8] 12/7 19/15 28/13 36/8 90/9 140/14 159/9 200/19 193/16 194/16 195/2 agreed [4] 94/9 97/7 143/5 194/10 anthropologist [15] 106/23 108/22 agreement [6] 122/7 122/9 122/10 114/21 122/13 122/24 124/5 125/1 122/12 126/12 179/5 125/5 125/18 136/9 148/8 166/7 agreements [1] 71/9 171/6 184/14 184/19 ahead [5] 39/6 57/7 131/23 158/16 anthropologists [1] 188/10 163/3 anthropology [13] 107/3 107/14 air [2] 17/12 17/14 107/18 107/19 108/2 108/12 111/7 air-conditioning [1] 17/12 120/17 126/9 151/13 166/13 akin [2] 132/16 133/24 184/22 188/11 Albuquerque [1] 14/25 anticoagulant [1] 103/15 antiquity [1] 175/17 alike [1] 166/21 allow [5] 5/5 23/7 40/7 96/20 anybody [1] 202/9 140/13 anyone [3] 204/20 205/18 205/19 allows [4] 22/19 22/21 79/18 anything [25] 13/12 15/18 28/25 146/19 39/21 57/13 78/19 102/8 110/10 116/15 117/4 117/21 127/19 almost [4] 49/10 58/1 156/24 184/18 128/20 138/9 152/16 153/19 alone [2] 144/16 184/9 187/22 189/3 189/6 189/7 193/5 along [3] 73/12 119/10 128/1 194/4 197/18 198/3 206/3 already [5] 31/6 44/17 69/19 anyway [2] 83/25 160/18 118/24 133/21 anywhere [7] 146/23 169/23 **altered [1]** 66/11 173/15 174/5 203/9 203/11 203/22 assessing [1] 8/14 although [5] 12/9 13/15 62/24 apart [2] 34/2 133/18 146/14 158/25 apologize [2] 5/18 13/10 apparently [2] 5/2 44/13 appear [3] 22/14 44/11 51/8 altogether [2] 13/17 33/14 aluminum [1] 144/10 always [12] 17/3 17/24 19/10 **appearance** [1] 155/8 37/18 38/25 47/17 47/18 47/21 appearances [2] 1/11 4/5 47/23 103/10 154/2 154/6 appeared [3] 1/22 13/15 182/2 amazon.com [1] 110/17 **appearing** [1] 4/13 amended [2] 145/21 145/23 appears [6] 4/7 24/19 49/18 85/16 **American [7]** 6/15 111/5 111/8 85/22 96/10

63/6 applicability [1] 22/17 application [4] 19/4 19/5 30/3 101/11 applications [1] 19/16 applies [2] 18/16 67/14 apply [1] 67/17 approach [10] 115/5 118/9 129/4 129/11 129/21 129/24 130/1 144/25 163/1 204/9 approaching [1] 132/9 appropriate [3] 66/9 66/16 78/7 appropriateness [1] 67/21 **approximate** [1] 130/16 approximately [7] 15/7 58/1 98/22 109/2 113/18 142/9 186/8 April [1] 102/19 archaeological [3] 107/25 129/11 184/15 area [36] 14/25 107/23 110/4 110/5 110/11 113/17 113/18 113/23 115/4 117/11 136/20 136/22 138/10 138/12 138/18 141/8 142/12 143/1 143/18 151/17 154/23 159/1 161/25 172/7 173/23 175/8 178/13 178/23 180/1 183/6 192/7 198/16 198/20 198/22 199/4 201/21 areas [10] 7/11 116/24 116/25 118/12 131/14 131/17 131/20 131/23 140/1 184/21 arise [2] 27/1 28/12 arm [4] 9/13 119/23 119/25 133/14 arms [1] 135/20 around [12] 30/11 116/25 117/19 117/25 117/25 118/11 118/23 118/23 123/6 149/20 197/8 203/22 arrived [1] 200/10 arthritic [2] 121/15 121/21 article [10] 73/16 74/8 74/9 74/11 74/15 74/17 75/1 111/18 111/20 111/22 articles [10] 15/18 73/7 73/10 75/8 76/15 110/12 111/14 180/4 181/7 205/8 artifact [1] 91/21 ARVIZU [6] 2/3 4/18 4/20 5/11 5/25 105/15 ascertained [2] 120/2 120/6 ash [4] 187/13 187/16 187/17 187/22 asked [15] 12/16 62/21 81/3 97/2 101/15 145/12 156/1 156/11 164/22 165/7 188/24 189/3 189/6 189/8 202/8 asking [6] 10/11 19/10 70/6 70/19 71/2 202/1 aspect [1] 80/14 assay [5] 77/3 77/3 77/4 77/10 80/16 assess [2] 66/5 172/13 assessment [3] 14/23 15/19 121/12 assessments [1] 15/10 assign [5] 56/4 125/10 146/24 152/20 153/4 assigned [1] 67/18 assigning [1] 123/1 assignment [2] 46/7 52/15 assist [6] 156/12 157/5 160/4 164/22 165/25 175/19

apple [5] 62/21 62/22 63/1 63/2

back [32] 7/4 38/2 39/6 44/19 47/6 47/12 56/25 62/23 112/23 113/6 **Assistant [2]** 4/8 4/10 47/10 48/11 66/25 69/3 71/20 119/10 119/24 119/24 127/18 assisted [1] 208/10 85/24 86/2 96/25 102/13 103/7 129/18 130/8 133/6 144/20 152/21 153/1 154/17 155/4 177/10 177/20 associated [3] 26/7 67/11 190/17 108/6 108/7 109/20 124/23 133/9 associations [4] 108/19 110/22 136/12 141/6 144/23 150/6 150/24 178/22 179/20 186/11 186/14 110/25 112/3 151/4 151/7 158/20 159/21 175/17 192/6 assuming [1] 104/7 178/20 190/19 believe [29] 22/11 27/12 32/8 69/6 assurance [1] 10/20 background [6] 6/10 7/11 115/1 69/18 71/4 76/2 78/25 82/3 94/22 **assure [2]** 146/17 205/2 120/8 157/13 157/16 96/24 97/23 101/3 109/20 146/6 **attach [2]** 153/9 193/23 150/10 154/25 157/12 161/2 161/9 **bad [2]** 102/19 102/20 attain [1] 108/1 bailiff [1] 206/6 162/7 162/10 164/25 170/19 182/1 attempt [3] 40/6 55/4 97/19 bar [9] 145/2 145/13 158/3 158/20 189/10 192/12 206/3 206/12 attempted [1] 59/14 158/24 159/11 159/12 204/5 204/9 belong [2] 108/19 112/4 attempting [1] 183/21 barely [1] 54/24 bench [1] 144/25 attempts [1] 205/19 barrel [34] 136/24 137/18 139/8 benefit [2] 76/5 76/8 attend [2] 114/4 114/5 144/6 146/2 146/16 146/21 147/4 beryllium [1] 19/11 attended [4] 108/10 128/4 177/22 147/7 147/15 147/21 147/23 149/2 besides [1] 148/24 177/24 149/6 149/21 149/24 150/2 150/15 | best [12] 10/17 25/13 27/15 27/17 attending [3] 115/2 115/3 178/6 153/7 155/2 178/25 180/21 181/6 116/4 121/16 158/11 170/9 179/4 attention [1] 12/4 181/8 181/23 185/22 186/3 186/9 184/20 194/25 208/13 **Attorney [23]** 1/17 1/19 2/4 2/5 186/17 186/25 191/12 191/23 bet [2] 85/7 85/9 2/6 2/7 2/8 2/11 2/12 2/13 2/14 better [7] 76/11 76/12 76/12 192/6 192/24 2/16 2/17 2/18 2/19 2/21 2/22 base [2] 149/18 159/15 106/12 128/25 178/1 199/21 2/23 2/24 4/8 4/9 4/10 145/12 based [16] 8/6 8/19 11/4 14/24 between [14] 23/25 33/16 37/18 **Attorneys** [1] 4/13 21/18 25/9 45/9 86/15 96/13 54/17 63/9 65/12 77/2 113/2 attributable [1] 72/2 101/15 102/4 121/1 134/17 138/14 147/21 150/14 169/22 198/1 attribute [1] 201/24 144/1 150/16 202/19 202/23 attributed [1] 159/4 beveling [2] 183/4 183/11 basic [1] 171/11 audit [4] 9/14 9/19 14/8 17/2 basically [5] 28/5 111/3 118/8 beyond [3] 58/2 67/20 153/16 audited [3] 9/7 10/5 11/25 118/20 196/16 big [10] 14/6 32/22 32/23 71/23 auditing [4] 9/16 15/9 15/15 16/23 basis [4] 32/15 51/25 121/24 173/5 72/5 82/11 99/22 108/15 113/17 batch [1] 31/25 auditor [9] 6/2 6/14 7/19 7/20 192/14 7/21 8/7 11/15 12/22 67/10 bay [3] 11/19 101/6 113/20 bigger [2] 50/23 99/23 auditors [1] 7/22 bear [2] 40/25 45/5 biggest [3] 8/16 52/6 52/9 audits [3] 9/2 11/8 17/22 because [68] 8/16 9/3 12/9 17/3 **Bio** [1] 6/12 August [1] 74/18 19/15 23/23 23/24 26/6 29/2 29/3 Bio-Chemistry [1] 6/12 29/6 29/21 30/24 37/2 43/17 August 1st [1] 74/18 **biological [7]** 55/22 107/13 107/18 auspices [2] 114/11 114/12 44/16 47/1 51/11 51/24 52/3 107/19 108/2 166/13 184/15 Austin [1] 164/10 52/24 54/4 61/14 63/15 63/19 biology [2] 108/12 109/12 authored [3] 15/23 20/15 160/24 bit [19] 5/14 6/8 7/14 11/12 26/25 68/14 76/1 76/11 79/21 80/17 authoritative [2] 74/6 74/19 84/8 87/15 91/25 92/8 97/1 99/17 30/5 39/18 86/4 99/7 106/11 auto [2] 34/10 201/24 101/9 101/21 116/16 117/24 107/7 109/5 118/4 127/6 136/14 automatically [2] 34/3 34/12 123/13 127/10 130/15 131/12 154/5 166/18 168/22 199/21 autopsy [2] 183/21 184/10 133/20 134/23 135/23 135/25 bits [1] 179/11 available [4] 27/20 27/21 59/21 138/23 141/7 144/21 147/1 154/15 black [1] 200/23 150/16 158/25 159/18 166/9 170/8 173/18 blackened [1] 132/7 average [8] 153/6 153/7 169/21 173/22 174/9 177/24 180/19 183/4 blank [10] 28/20 36/9 36/17 37/15 174/1 174/4 179/18 192/5 192/7 190/20 193/22 196/25 202/3 202/7 38/18 38/25 39/18 41/6 48/23 AVERY [29] 1/6 1/21 4/2 4/14 become [3] 120/14 175/12 206/2 53/14 45/16 81/16 82/12 86/14 89/8 becomes [2] 132/16 175/14 blanks [13] 36/18 36/19 37/2 91/13 95/12 104/2 106/21 139/12 37/17 37/18 38/24 39/12 39/16 becoming [1] 132/19 142/19 143/19 144/3 144/15 153/8 before [39] 1/9 6/8 17/24 25/17 40/25 41/13 45/6 46/16 49/10 161/18 191/23 194/10 194/17 37/5 46/14 48/24 51/21 54/15 Blazer [5] 200/8 200/23 200/23 195/3 198/17 198/25 200/10 61/5 62/16 66/17 86/13 101/21 201/1 201/6 202/22 203/11 105/13 112/13 116/24 123/10 bleeding [2] 29/8 59/4 Avery's [35] 50/3 50/24 51/5 54/9 124/6 125/24 126/4 126/6 143/10 blindfolded [1] 62/20 54/23 55/3 55/11 57/19 59/5 150/9 151/3 155/24 158/19 162/6 **blocking** [1] 35/2 59/13 61/16 61/18 63/22 63/24 166/5 167/1 174/23 189/15 197/21 blood [73] 26/16 28/17 29/8 29/12 79/12 82/12 83/11 84/6 84/16 203/21 203/21 204/13 204/15 29/16 29/23 30/2 30/22 30/25 84/23 86/19 86/21 86/25 88/5 36/10 41/22 42/1 43/2 43/3 45/2 206/21 207/5 90/1 91/3 102/2 136/21 137/20 began [2] 195/6 195/7 45/4 45/16 47/7 49/19 50/4 50/24 138/12 138/19 148/12 151/18 begin [4] 5/21 64/19 160/5 179/4 51/1 54/3 54/9 54/16 55/3 55/8 beginning [3] 13/9 96/25 98/7 152/22 199/5 55/11 57/18 57/19 59/13 59/20 avoid [1] 205/24 begins [2] 175/6 175/10 behalf [7] 1/12 1/14 1/16 1/18 61/11 61/11 61/16 61/17 61/18 63/22 63/24 65/22 65/25 66/2 aware [7] 179/24 180/3 180/7 180/15 181/6 184/4 206/2 1/20 4/10 164/23 66/4 66/7 67/9 67/23 70/18 79/11 away [3] 140/6 150/25 180/22 behind [24] 111/20 136/21 137/20 79/12 80/2 80/6 81/12 81/15 awfully [1] 90/14 138/10 138/12 138/18 139/6 141/9 82/12 83/12 84/6 84/24 86/14 axiom [1] 130/23 142/12 143/18 146/22 148/12 86/19 86/21 86/25 87/23 88/5 148/24 151/17 152/21 153/8 89/12 90/1 91/3 91/13 94/13 95/12 102/1 102/2 102/25 103/12 153/12 153/14 161/25 191/23 bachelor [2] 6/11 107/13 192/9 200/9 201/4 201/6 bloodstain [10] 22/22 22/22 23/21

bachelor's [1] 107/12

Α

being [28] 8/4 18/23 35/10 44/20

В	bringing [1] 102/25	32/23 34/8 40/19 42/16 44/15
	brings [1] 141/6 brisk [1] 63/4	45/7 46/17 46/19 46/20 68/23 84/25 85/16 85/23 87/2 92/7
78/11 93/7 93/9 93/14	Britain [1] 108/6	105/24 112/17 112/23 113/6
bloodstains [11] 20/23 22/20 56/6	British [1] 170/11	113/13 114/4 114/16 136/21 188/6
59/10 63/15 65/19 73/5 73/9 73/19 74/13 97/21	broad [1] 44/9 broader [1] 148/5	195/16 calling [8] 19/10 39/24 41/9 45/10
blowing [1] 63/5	broke [1] 102/17	45/17 123/23 125/11 136/20
blue [5] 132/9 162/17 162/18	broken [1] 68/15	calls [4] 4/1 4/17 113/25 196/23
162/20 180/9	brought [2] 104/6 106/15	Cambridge [2] 107/17 108/3
board [5]	BT [1] 170/15 BTU [7] 170/11 170/15 170/22	Canada [5] 106/17 107/2 108/7 109/23 112/19
bodies [1] 175/19	171/1 173/9 173/15 173/15	Canadian [1] 112/14
body [34] 120/2 128/8 129/20	BTUs [5] 169/12 173/4 173/7	cannot [13] 67/20 104/17 123/7
129/22 129/25 131/12 131/15 133/7 135/7 135/18 140/1 140/17	173/19 174/6 Buchner [8] 196/2 196/11 198/11	124/8 125/10 125/12 126/8 126/10 138/21 142/21 143/16 163/17
140/18 141/20 147/6 169/13 172/4	198/22 201/11 202/11 202/14	168/1
172/7 172/14 174/23 174/25 175/5	203/20	capable [2] 72/22 72/25
175/7 175/10 175/11 175/15 176/23 177/13 178/17 185/21	bullet [3] 122/16 122/23 123/25 bunch [1] 118/9	capacity [1] 13/19 capillary [1] 75/20
186/20 189/14 189/18 191/11	buried [1] 139/21	car [6] 28/20 95/10 104/13 189/17
boiler [3] 149/22 187/4 187/14	burn [66] 129/25 131/13 131/15	200/13 203/7
bone [52] 117/15 122/15 123/19 123/20 126/20 126/23 127/10	131/16	carcasses [1] 190/8 care [1] 118/10
127/14 127/19 127/23 128/6		care [1] 116/10 career [2] 8/13 15/16
128/11 130/16 130/21 130/22	142/14 142/25 143/1 143/11	careful [1] 130/5
130/25 131/1 131/11 132/4 132/7 132/8 132/12 132/14 132/25	143/14 144/2 144/19 146/16	carefully [4] 96/1 130/13 133/15 208/8
133/14 133/17 133/18 136/1 136/4	146/21	carrying [1] 5/4
136/7 136/17 137/6 137/11 137/17	149/22 152/2 153/7 153/24 154/15	carryover [2] 37/21 37/23
137/20 137/25 138/9 138/20 139/6 141/13 152/5 152/21 153/5 155/5	155/2 172/24 174/9 174/9 177/21	cars [2] 201/21 202/21
160/14 161/13 179/6 179/15	178/22 178/23 178/25 180/1 180/5 180/14 180/20 180/21 181/6 181/8	case [100] 1/5 4/2 14/19 20/7 20/13 21/5 21/7 24/11 25/13
181/15 182/13 189/20 192/10	182/18 185/16 185/22 186/9	26/11 26/19 27/5 27/19 29/25
bones [51] 119/8 119/21 119/23	186/16 186/17 189/18 190/22	31/25 31/25 33/22 33/23 35/11
119/25 125/24 126/4 130/17 134/8 134/9 134/10 134/25 135/6 135/11	190/25 191/12 191/23 192/6 192/7 burned [37] 129/22 130/1 133/7	36/21 36/25 37/3 38/14 45/20 49/22 51/2 57/23 59/1 59/7 59/12
136/6 136/12 137/8 139/19 140/5	133/20 134/20 135/1 135/12	60/12 61/3 61/4 61/4 64/8 64/9
140/23 141/11 141/11 141/19	139/17 140/7 142/17 146/2 146/15	
141/19 141/20 141/22 141/25 142/4 142/6 143/5 146/15 146/20	146/20 146/21 146/22 146/23 147/3 147/6 147/7 147/14 147/23	75/11 77/17 79/9 79/10 79/13 80/4 85/17 85/23 86/3 86/7 86/9
152/5 152/9 152/16 152/23 153/1	148/11 148/13 148/24 148/25	87/24 93/15 94/8 95/10 103/11
153/2 154/13 154/14 154/21 154/23 180/18 181/22 182/1	149/5 150/1 150/15 150/17 151/17	
184/16 186/15 188/16 189/25	151/22 152/9 176/23 177/10 181/23 185/21 188/3	114/15 117/11 120/9 120/10 120/20 121/4 122/21 125/16
191/4 191/5 191/8	burner[1] 187/14	127/10 134/7 136/19 143/8 145/5
book [2] 110/12 110/14	burning [20] 125/24 126/4 127/9	156/1 156/4 157/3 157/15 157/25
bore [1] 34/24 borrow [1] 59/24	129/19 132/12 135/16 143/7 143/9 152/6 172/1 174/15 176/20 185/17	
both [21] 9/2 9/4 9/21 11/12 16/15	186/4 186/25 187/5 187/9 189/15	205/11 205/13 205/16 205/19
37/22 70/24 70/25 76/10 77/14 82/4 82/6 83/15 83/16 96/3	189/16 190/9 burns [6] 131/12 142/22 143/10	205/21 205/23 206/2 206/11
107/24 111/1 112/22 136/15	181/24 182/1 190/7	206/14 206/25 cases [11] 139/16 139/18 140/15
194/10 201/9	burnt [8] 130/20 130/22 135/4	142/24 143/4 156/24 157/2 165/9
bottom [9] 38/3 38/4 39/10 44/10 50/18 143/12 145/23 147/10	140/5 154/5 189/19 190/16 192/24 business [9] 10/6 10/17 14/21	
172/12	15/19 22/2 22/3 61/24 199/13	cause [11] 90/18 91/1 123/2 123/7 124/11 124/20 125/3 128/2 131/6
boxes [1] 198/20	199/19	136/2 183/17
boy [1] 32/6		caused [4] 66/25 91/22 127/2
BRANCH [2] 1/1 208/5 brand [2] 54/16 60/22	5/20 57/1 68/19 69/9 72/9 87/5 95/21 189/4	127/8 causing [1] 130/18
break [12] 64/6 64/9 104/22	butter [1] 67/1	CD [3] 93/14 95/10 160/12
	buying [2] 8/2 8/2	CDs [1] 157/7
176/4 176/6 176/11 204/13 breakage [2] 131/8 135/24	C	cellulose [1] 187/13 Celsius [1] 170/3
breakdown [1] 72/2	cake [1] 18/10	center [2] 35/13 200/4
breaks [1] 70/3	Cal [1] 6/12	centered [1] 113/10
Brendan [2] 159/4 159/4 Brewer [2] 35/10 35/10	calcination [2] 131/11 193/21 calcined [3] 132/10 132/13 154/24	centigrade [1] 170/5 certain [7] 34/10 46/23 47/2 167/3
brief [3] 69/19 151/5 161/7	calcium [1] 70/18	168/12 172/15 179/11
briefly [3] 159/12 176/10 195/14	cali [1] 35/9	certainly [35] 54/25 59/9 76/17
bring [6] 88/13 147/24 151/3 151/6 158/20 159/20	calibration [1] 77/12 called [29] 4/20 22/13 24/5 25/11	96/12 114/22 121/5 121/22 121/23 122/9 122/21 125/12 126/25 130/3
121,0130,2013,20	.,, , ,	

concerning [3] 157/14 158/22 **clearly [9]** 14/4 78/21 83/9 86/3 C 86/16 87/17 95/12 147/13 180/18 206/1 certainly... [22] 131/24 143/10 Clerk [1] 5/6 concerns [3] 89/20 206/5 206/6 Clerk's [2] 57/19 59/20 close [4] 92/10 119/24 189/25 143/23 143/25 144/4 149/13 **conclude [5]** 50/10 101/24 102/3 149/24 173/1 177/5 177/9 182/14 146/19 204/12 183/23 184/9 184/21 184/23 185/7 concluded [1] 207/11 206/7 186/7 186/23 188/2 193/14 193/17 clothing [6] 175/9 180/4 181/7 conclusion [18] 21/16 21/18 25/10 195/10 191/15 191/16 191/21 40/1 58/24 59/3 59/8 61/21 84/9 certainty [9] 134/19 137/24 151/16 clustered [1] 119/6 94/23 96/20 97/9 126/3 129/24 151/21 152/1 152/5 163/17 164/16 coal [1] 173/6 133/7 141/8 141/14 185/3 conclusions [1] 23/11 185/16 colleagues [2] 112/2 120/16 **collected [4]** 13/2 49/20 66/6 67/9 **collecting [1]** 35/5 certificate [1] 42/10 concur [1] 82/13 certification [3] 188/6 188/9 condition [4] 126/23 126/23 182/8 188/12 collection [5] 65/25 66/2 66/4 66/7 184/17 certified [4] 6/14 42/19 43/6 66/20 129/5 conditioning [1] 17/12 certify [6] 56/1 56/2 66/23 67/20 College [1] 111/8 conditions [5] 23/3 28/12 55/19 102/22 208/6 color [4] 131/22 155/8 197/17 167/6 177/6 CF [2] 1/5 4/2 conducive [1] 124/13 chair [2] 106/25 109/6 combination [4] 9/1 67/24 67/25 conduct [1] 184/10 conducted [2] 9/2 65/21 **challenge [1]** 148/6 118/17 **challenges [1]** 113/10 comes [5] 69/24 69/25 117/25 **conducting [1]** 177/25 chambers [2] 176/10 207/3 conference [1] 110/13 confidence [2] 10/1 42/12 118/23 119/16 **chance [1]** 120/19 comfortable [1] 159/16 chances [1] 179/20 coming [3] 110/14 199/12 200/14 confident [1] 11/4 change [1] 44/25 comingled [1] 120/5 confidentially [1] 206/18 **changed [1]** 44/21 command [3] 197/3 200/2 200/4 configured [1] 65/5 changes [3] 121/15 121/22 131/22 commercial [11] 8/24 9/3 9/5 9/8 confirm [1] 46/7 **chapters [1]** 110/12 9/22 13/14 16/2 43/6 169/7 169/8 confirmation [3] 22/19 83/14 characteristic [3] 47/2 52/7 70/5 169/9 83/15 characteristics [1] 122/18 commercially [2] 43/25 56/19 confirmed [1] 95/16 characterization [1] 202/25 common [4] 24/14 26/22 120/24 conform [3] 42/17 52/2 122/21 characterize [1] 77/16 conforms [1] 111/22 172/25 **charred [5]** 155/1 155/6 155/7 commonly [2] 110/8 172/24 confuse [1] 101/14 confusion [2] 146/13 147/18 184/2 184/3 communicating [1] 111/3 charring [4] 131/10 132/7 187/22 communications [1] 206/1 conjunction [1] 164/14 193/21 **community** [1] 109/2 connected [2] 65/5 65/8 chase [1] 154/4 comp [1] 70/23 consequence [2] 169/4 169/5 check [2] 11/9 115/5 comparably [1] 82/4 consider [2] 17/21 18/22 considerably [1] 61/2 checkpoint [3] 196/16 196/19 compared [1] 75/8 considered [4] 42/2 75/14 76/1 197/3 competency [1] 61/6 chemical [4] 55/16 55/18 56/21 compiled [2] 157/9 164/4 76/5 complete [3] 6/19 6/22 131/11 101/5 considering [1] 58/11 chemicals [5] 55/20 65/15 69/21 completed [2] 6/18 108/17 consistent [7] 53/22 61/13 127/2 69/24 69/25 completely [9] 18/19 19/4 26/15 138/6 138/7 152/25 182/14 chemist [4] 22/7 61/23 96/9 100/1 26/18 38/25 82/13 88/1 88/2 consistently [2] 10/24 174/9 chemistry [13] 6/12 6/13 7/16 7/17 consists [1] 21/5 153/16 18/4 22/3 55/25 74/1 74/17 74/21 complex [10] 70/23 71/16 72/11 consult [1] 113/13 74/23 84/11 92/10 72/23 76/4 83/11 84/22 85/14 consultant [2] 107/3 113/15 chemists [1] 16/6 85/14 95/15 consulting [1] 166/6 consumed [3] 127/19 132/1 178/16 cherry [1] 84/11 complicated [1] 90/23 Chief [2] 107/4 113/16 complicating [1] 26/7 consumer [1] 8/17 chocolate [1] 18/10 complications [1] 63/2 consuming [1] 190/10 chop [1] 178/11 comply [1] 206/9 contact [1] 158/22 chromatograms [1] 32/12 component [2] 69/20 69/21 contacted [1] 114/2 chromatographs [1] 65/3 composition [3] 42/9 56/22 66/11 contain [2] 59/19 70/14 chromatography [5] 16/7 69/22 compound [3] 30/15 47/21 77/13 contained [2] 59/11 102/2 69/23 73/20 75/21 circled [1] 44/18 compressed [1] 61/7 container [5] 59/19 66/7 66/8 66/9 compute [1] 27/20 computer [5] 35/3 53/5 56/25 66/16 CIRCUIT [3] 1/1 1/10 208/5 **contaminant** [1] 11/19 circumstances [6] 106/20 110/8 contaminate [1] 116/11 57/12 208/10 110/9 119/19 129/19 157/14 computer-assisted [1] 208/10 contamination [6] 17/10 17/15 cited [1] 142/11 computerized [5] 118/20 118/22 115/6 115/22 116/5 116/7 civil [1] 14/11 164/5 164/8 208/9 CONTD [1] 176/17 classroom [1] 109/17 content [1] 127/13 concentrated [3] 12/6 43/22 80/19 **context** [6] 116/4 119/7 129/20 133/19 139/22 166/11 clean [2] 26/9 89/12 concentration [11] 24/12 30/18 cleanliness [1] 66/17 54/18 79/22 80/4 80/7 90/25 clear [21] 14/17 49/16 53/13 60/10 100/5 116/24 117/2 118/13 contexts [1] 107/24 68/8 68/19 72/19 72/21 90/7 97/2 concentrations [3] 53/24 88/2 continuation [1] 4/3 99/6 116/25 124/25 130/12 134/7 continue [3] 6/25 57/2 89/11 96/19 157/19 180/17 181/21 182/17 concern [4] 40/22 130/20 145/19 contracted [1] 9/18 182/22 190/20 contracting [1] 6/4 cleared [1] 124/17 concerned [4] 11/10 45/21 68/22 contraction [1] 136/1 clearing [1] 118/11 114/9 contractor [1] 14/22

counterintuitive [1] 30/6 C D country [1] 15/5 contracts [1] 9/5 **D-14[1]** 163/14 COUNTY [2] 1/1 208/2 contrast [1] 77/10 couple [6] 45/6 47/10 57/10 **D-15 [1]** 163/20 control [36] 8/11 10/23 17/10 **D-16** [1] 163/11 103/23 151/3 180/21 28/19 32/2 36/14 36/15 37/11 course [8] 6/18 8/13 13/13 42/24 damage [5] 130/18 130/18 131/7 38/1 41/15 42/3 42/6 42/7 42/7 69/18 70/16 70/17 109/21 154/21 182/8 42/16 42/18 42/20 42/21 42/25 courses [2] 108/23 109/11 dark [1] 132/6 43/12 45/7 45/11 45/11 45/17 court [25] 1/1 1/10 1/25 4/1 4/7 dashboard [3] 93/7 94/14 94/25 **Dassey [1]** 159/4 45/19 87/2 87/5 87/16 87/19 88/3 5/19 81/3 86/24 112/13 112/14 Dassey's [1] 159/5 88/22 88/24 89/7 89/25 91/20 112/23 119/15 146/17 150/6 118/14 data [73] 6/5 6/6 7/24 8/4 8/4 8/5 166/10 166/16 200/18 205/3 8/14 8/21 10/25 11/2 11/3 13/16 controlled [1] 117/8 205/14 206/8 206/17 206/20 208/4 13/16 13/18 15/4 15/9 15/19 controls [3] 13/5 16/20 36/11 208/5 208/19 conversation [3] 194/19 195/5 24/16 24/19 27/18 27/20 27/21 Court's [2] 204/16 206/10 28/2 29/17 31/23 32/14 35/5 35/7 204/23 courtroom [3] 67/8 145/16 196/1 convert [2] 170/5 170/9 courts [2] 112/10 112/15 35/10 35/17 41/16 41/18 44/5 53/1 53/18 53/20 54/5 54/7 54/12 converted [1] 70/17 coverage [2] 131/18 205/3 covered [1] 162/17 58/4 60/9 60/19 61/8 66/5 69/8 cool [1] 128/2 cooling [2] 127/17 127/23 covers [1] 113/17 69/9 71/22 72/4 72/9 72/15 72/17 cools [1] 127/23 72/20 78/22 80/9 81/13 82/3 cracks [1] 134/3 84/14 85/4 86/15 86/20 90/3 91/2 92/14 92/23 94/22 96/4 96/4 52/3 157/24 160/9 created [5] 41/23 41/23 146/13 96/24 101/7 101/12 101/12 101/16 cordless [2] 194/18 195/5 151/1 171/9 102/4 coroner [7] 107/4 113/16 114/6 creates [1] 149/16 data/Brewer [1] 35/10 114/7 114/12 114/12 125/15 creating [1] 175/20 dataset [1] 33/21 correct [119] 12/17 39/5 40/3 date [27] 1/8 20/24 31/20 35/14 cremain [2] 116/18 116/18 40/13 40/18 40/24 41/4 41/5 35/16 46/2 52/24 56/14 57/14 cremains [13] 110/11 113/3 113/5 43/13 46/15 49/7 49/9 53/15 116/17 139/17 140/16 146/1 147/3 57/17 58/2 60/5 66/3 67/13 67/16 54/20 58/3 65/17 68/23 69/11 67/18 67/20 68/5 68/9 68/15 148/11 148/17 154/11 168/15 71/17 71/19 72/5 73/1 73/2 74/14 97/24 98/1 102/14 102/19 102/21 184/20 76/6 77/1 84/25 86/12 86/19 91/5 cremate [2] 169/13 169/22 102/23 103/5 91/20 92/12 92/13 92/17 92/24 dated [3] 20/25 74/18 208/15 cremated [18] 106/22 110/6 113/3 93/5 93/8 93/13 93/18 95/8 95/11 113/7 114/17 117/12 125/19 dates [3] 34/1 57/23 68/3 96/8 97/5 97/6 97/21 98/3 98/11 130/17 130/25 151/14 153/24 day [18] 1/4 10/13 10/13 10/14 103/5 103/17 103/19 104/15 108/4 13/22 13/24 35/8 102/20 164/19 168/25 169/1 169/1 169/4 171/4 172/9 174/23 112/24 114/14 126/11 126/20 197/8 197/16 197/23 197/25 198/1 126/21 137/22 142/3 156/2 156/14 cremation [3] 110/15 130/24 199/1 202/18 202/22 208/15 156/23 157/23 160/8 160/11 days [7] 57/11 118/4 162/6 175/17 142/24 197/20 198/2 202/19 160/19 160/22 164/11 165/5 165/8 cremations [4] 168/24 169/7 169/8 166/8 168/1 169/20 170/1 170/2 dead [3] 124/6 124/7 191/11 169/9 171/21 172/5 172/10 172/11 deal [6] 112/7 121/6 174/12 crematorium [1] 174/24 172/25 173/12 174/16 175/1 175/2 174/20 179/7 186/21 crematoriums [1] 169/3 175/16 176/25 177/6 178/8 180/1 crest [1] 137/7 dealing [6] 12/24 91/9 94/8 94/12 180/5 180/16 181/12 181/14 crime [13] 94/4 109/22 109/24 116/16 123/13 182/25 183/2 183/6 183/7 184/11 113/8 113/14 113/25 114/16 deals [1] 184/22 184/12 185/19 185/25 186/21 187/1 187/7 187/9 187/10 187/12 dealt [2] 140/15 142/24 DEAN [2] 1/17 4/13 114/17 156/12 161/14 161/16 166/20 166/23 187/18 187/24 188/1 188/14 death [15] 123/1 123/2 123/6 criminal [4] 14/10 14/11 112/5 190/23 191/2 193/24 194/12 197/9 123/8 123/9 123/10 124/11 124/20 160/25 125/3 125/7 125/11 126/7 183/17 202/11 203/25 208/12 criteria [4] 39/23 44/20 51/14 correctly [1] 197/15 183/17 183/18 83/23 cotton [1] 89/12 cross [14] 2/5 2/12 2/17 2/22 debris [1] 187/17 could [48] 4/25 10/1 17/14 24/23 decide [4] 46/7 49/19 61/25 64/17 64/22 96/4 147/24 149/18 29/11 30/6 31/1 32/17 37/10 155/17 158/24 176/17 198/8 176/23 decided [1] 44/19 40/15 48/11 49/25 52/19 55/6 201/16 deciding [2] 19/2 38/9 55/11 57/4 58/15 60/3 61/10 cross-examination [13] 2/5 2/12 61/17 62/25 65/7 67/1 69/5 74/16 2/17 2/22 64/17 64/22 147/24 decision [2] 44/25 204/16 75/16 78/9 80/11 83/2 102/1 decisions [3] 8/6 8/19 11/4 149/18 155/17 158/24 176/17 106/14 119/7 122/25 148/23 198/8 201/16 declined [1] 189/4 148/25 150/6 173/11 179/12 crossed [1] 47/9 defect [2] 122/14 123/22 179/15 181/21 185/21 187/25 Crown [6] 112/19 156/8 157/1 **defects** [1] 183/2 188/1 191/11 197/19 201/24 **DEFENDANT [4]** 1/7 1/18 1/20 1/21 165/10 165/18 165/23 crushed [1] 120/5 crystals [1] 80/22 201/25 203/20 defense [12] 4/15 4/17 105/2 couldn't [7] 30/7 63/21 63/23 105/11 106/18 112/5 112/23 86/24 191/13 197/24 202/15 curious [3] 112/16 113/2 132/3 150/22 157/14 157/16 164/24 counsel [17] 64/11 106/18 124/17 current [1] 76/15 195/13 144/24 145/20 146/17 148/1 158/3 currently [2] 106/25 113/15 defensible [1] 10/14 158/13 158/19 162/24 163/7 176/9 curriculum [1] 107/5 defined [1] 22/15 178/21 194/12 204/12 207/3 curve [2] 55/24 132/18 definitely [2] 136/2 192/4 counsel's [1] 149/19 definition [2] 30/17 170/19 cut [5] 24/25 25/2 25/4 25/5 25/6 degradation [2] 55/21 55/24 count [1] 92/11 CV [1] 207/7

D degrade [2] 55/17 98/8 degraded [3] 54/23 66/11 113/12 degree [16] 42/12 107/12 107/17 108/5 108/11 134/19 137/24 151/16 151/21 151/25 152/4 170/16 175/1 181/23 185/16 193/20 degrees [4] 169/23 169/25 170/17 170/17 dehydrate [2] 175/4 175/10 delayed [1] 5/2 delicate [3] 141/11 141/13 191/8 demand [1] 146/7 denied [1] 189/6 density [2] 130/16 132/24 dental [1] 141/11 deny [1] 182/15 depart [2] 168/3 168/12 department [8] 6/24 7/1 10/9 19/8 107/1 108/12 109/6 109/9 dependent [3] 55/18 132/24 204/17 depending [1] 19/16 depends [4] 19/14 81/10 154/3 172/2 depicted [1] 201/2 deposited [1] 94/13 describe [6] 44/6 65/7 103/9 122/17 133/12 198/13 described [4] 80/10 110/2 128/11 201/22 describes [3] 16/17 20/21 37/12 describing [2] 23/2 111/24 description [8] 22/16 22/17 22/24 35/20 46/2 88/10 117/14 202/15 designated [2] 40/17 49/17 designed [4] 23/4 23/5 55/8 100/23 detail [2] 34/25 166/19 detailed [1] 52/20 detect [54] 12/10 19/13 22/22 23/8 difficult [6] 88/17 128/19 153/23 23/9 23/12 23/17 23/23 25/7 25/25 27/10 28/7 29/2 30/3 30/7 30/7 30/9 30/24 41/25 42/23 44/16 51/4 51/6 53/21 54/5 59/12 59/14 61/15 62/3 62/14 62/17 62/18 62/23 63/1 63/5 63/8 63/21 63/23 65/22 78/16 78/19 78/23 79/11 79/18 80/1 80/24 81/1 81/5 81/9 81/14 81/20 86/9 94/19 99/24 detectability [1] 100/2 detectable [11] 29/15 30/21 50/7 53/17 54/2 54/24 61/19 78/23 79/2 96/22 96/23 detected [53] 11/20 11/24 12/6 21/20 23/21 25/2 25/3 25/5 28/9 28/14 29/6 29/24 30/8 38/10 38/10 38/17 38/19 39/11 39/15 39/23 40/2 40/21 41/2 41/3 41/7 41/10 43/20 44/22 47/8 50/12 54/8 58/19 58/20 58/23 58/25 59/2 63/16 80/18 80/18 80/19 80/20 80/25 83/18 91/12 93/1 93/12 93/17 95/6 95/9 100/4 100/7 101/17 104/9 detecting [9] 13/12 23/15 53/12 53/23 72/22 78/9 79/8 91/25 92/1 detection [59] 12/1 12/2 19/12 24/2 24/4 24/5 24/20 25/10 25/11 25/15 25/19 25/20 25/24 27/3

27/16 27/25 27/25 29/3 29/10 30/10 30/15 30/17 49/19 62/2 62/7 62/9 62/12 63/9 63/10 63/20 76/23 76/25 76/25 78/3 78/5 78/8 78/14 81/5 82/5 82/6 82/14 90/19 91/24 92/3 94/18 95/1 95/4 96/13 96/16 97/14 99/7 99/8 100/9 100/11 100/13 100/18 100/18 100/22 101/22 detectives [1] 196/25 detects [4] 70/4 77/6 78/15 97/8 determination [2] 125/17 138/16 determinations [1] 123/16 determine [12] 13/14 21/13 22/6 27/4 34/19 36/2 36/3 42/9 50/1 101/8 126/15 140/21 determined [6] 27/17 41/24 67/18 74/11 137/9 141/2 determining [3] 78/5 78/14 172/1 develop [1] 60/22 developed [4] 63/13 79/17 79/18 162/4 developing [1] 77/20 development [2] 60/24 75/10 deviate [1] 18/6 deviated [1] 168/16 diameter [1] 192/16 Diane [3] 1/24 208/4 208/19 die [1] 194/24 differ [2] 128/15 148/6 difference [11] 23/25 26/5 26/6 63/9 65/8 65/12 77/2 147/20 150/14 150/20 150/21 differences [2] 91/1 154/19 different [33] 8/3 8/3 10/2 16/5 19/15 19/16 25/19 25/25 39/19 43/15 46/3 62/10 62/11 62/12 75/19 75/24 77/12 88/1 88/2 96/5 99/18 101/13 109/11 118/6 119/19 131/22 135/11 136/3 147/12 147/13 147/13 161/23 166/24 differentially [1] 131/13 186/7 186/24 187/2 digress [1] 183/15 diluted [2] 24/25 43/23 diluting [2] 25/17 26/4 direct [14] 2/4 2/11 2/16 2/21 5/23 36/8 57/2 76/20 82/16 90/16 96/3 100/20 106/8 195/22 directly [7] 25/14 26/2 82/25 89/21 89/22 129/13 201/6 disagree [10] 29/18 29/19 121/11 126/2 137/14 149/7 173/2 173/5 184/23 185/2 disaster [1] 167/17 discipline [3] 7/22 15/12 15/14 disciplines [1] 9/9 DR [3] 2/10 105/24 146/4 disclosure [6] 145/22 145/23 146/8 Dr. [40] 19/19 29/14 97/19 104/17 146/8 148/3 148/9 discontinuity [2] 122/19 123/25 discovered [1] 162/6 discovery [2] 161/6 161/8 discuss [7] 64/8 104/22 145/5 176/5 205/16 205/19 206/4 discussed [3] 96/3 159/11 178/21 discussing [2] 204/20 205/21 discussion [2] 158/18 176/19 dismembered [1] 189/14 dismembering [2] 178/8 178/9 display [4] 46/3 59/17 72/8 72/9 displaying [1] 50/9 disposal [1] 160/3

dissertation [3] 6/17 6/20 6/25 dissipate [2] 193/11 193/17 distant [1] 161/24 distinguish [1] 154/17 distributed [1] 178/3 distribution [1] 119/11 District [2] 4/8 4/10 disturbed [2] 133/9 138/11 **Division** [1] 160/24 dizzy [1] 51/19 **DNA [2]** 26/23 184/3 **Doc [3]** 185/11 188/15 194/3 doctor [3] 147/25 155/19 183/20 Doctor, [3] 160/1 176/19 187/4 Doctor, as [1] 160/1 **Doctor, I [1]** 176/19 Doctor, that [1] 187/4 doctoral [1] 108/11 doctorate [1] 108/17 document [4] 88/9 117/4 119/16 164/7 documentation [7] 17/18 119/14 128/18 129/18 138/15 138/23 138/24 documented [2] 18/19 136/18 documenting [3] 115/21 118/18 119/18 documents [1] 157/19 **DOE**[1] 6/23 doesn't [31] 11/13 14/5 18/11 18/13 29/7 39/2 40/7 42/17 43/17 43/23 48/10 51/8 51/13 51/24 63/6 63/7 77/5 78/18 80/3 80/25 81/6 84/8 92/11 102/19 102/20 102/23 104/4 131/13 147/17 147/17 149/24 doing [16] 6/25 15/7 15/9 17/1 17/22 27/15 46/4 52/20 64/16 66/8 76/2 98/12 117/4 156/15 197/1 202/7 dollars [2] 11/11 11/23 done [25] 8/12 8/15 26/19 27/15 27/22 29/25 37/20 37/22 49/10 60/17 108/15 108/16 117/23 117/23 118/13 121/2 128/12 129/21 130/5 156/9 168/14 185/10 185/11 190/13 194/3 door [2] 93/10 95/6 doors [1] 63/3 doubt [1] 122/2 down [34] 12/4 16/19 25/6 30/11 54/24 60/6 60/7 68/15 81/3 86/2 86/4 88/23 90/17 90/18 90/22 91/12 99/8 102/17 106/11 106/16 109/4 130/10 131/1 161/22 192/22 197/19 198/5 198/19 199/4 199/6 199/8 199/17 200/15 202/10 105/21 106/6 106/14 120/10 120/25 121/3 121/12 124/21 126/2 126/13 128/9 129/12 134/7 137/4 138/1 138/17 139/3 141/6 142/11 143/15 145/8 146/18 148/9 149/11 149/12 151/12 157/9 157/12 157/22 160/7 160/14 161/13 163/25 188/24 189/13 207/7 Dr. Eisenberg [16] 120/25 124/21 128/9 129/12 134/7 137/4 138/1 139/3 141/6 143/15 157/9 157/22 160/7 160/14 161/13 163/25 **Dr. Eisenberg's [9]** 121/3 121/12 126/2 126/13 138/17 142/11

<u> </u>	43/24 44/21 47/3 49/23 49/25	202/3 202/12 206/8
D	50/2 50/7 50/13 51/4 51/6 51/11	ended [2] 12/8 12/11
Dr. Eisenberg's [3] 149/12 157/12	53/12 53/17 53/21 54/3 54/8	ends [1] 131/19
189/13	54/13 54/18 54/22 55/1 55/2 55/4	energy [8] 6/24 7/1 1
Dr. Fairgrieve [7] 106/14 145/8		
	55/10 55/16 55/24 56/6 56/7 56/9	170/15 171/2 173/20
146/18 148/9 149/11 151/12	56/10 56/17 56/20 57/25 58/19	Energy's [1] 19/9
188/24	59/2 59/11 59/15 61/15 63/14	enforcement [7] 109/
Dr. Fairgrieve's [1] 207/7	63/23 64/1 65/19 65/22 67/14	114/23 156/13 164/2
Dr. LeBeau's [3] 29/14 97/19	68/2 68/6 68/15 69/16 69/17 70/7	England [1] 107/17
104/17	70/11 70/14 71/14 72/22 73/1	enough [9] 11/3 26/9
Dr. Leslie [1] 120/10	73/8 73/18 74/12 76/4 76/13 77/8	99/24 150/21 183/23
Dr. Marc [1] 19/19	77/9 78/10 78/16 78/19 79/6	
/		enrich [1] 110/24
Dr. Scott [2] 105/21 106/6	79/19 79/22 80/1 80/4 80/6 80/7	ensure [1] 10/24
draw [4] 23/11 62/5 96/20 133/6	81/12 81/15 81/19 81/20 82/14	ensuring [1] 11/1
drawing [2] 129/24 151/13	83/9 84/5 84/15 84/23 85/15	entered [1] 35/22
drawn [2] 61/22 185/3	86/13 86/18 87/11 89/7 90/4	entire [2] 31/24 68/1
draws [2] 58/24 59/3	91/12 92/7 92/15 93/1 93/12	entirely [7] 53/22 77/
drew [1] 25/9	93/17 94/20 94/24 95/3 95/6 95/9	147/11 147/12 147/1
dried [7] 20/23 26/3 73/5 73/8		
	95/14 95/15 96/22 97/4 97/8	entrance [3] 122/16 1
73/18 74/13 78/11	97/12 97/14 97/20 98/4 98/6	entree [1] 62/8
dries [1] 136/1	98/10 98/14 98/20 101/16 101/18	entry [1] 38/12
drink [1] 20/1	102/16 103/18 104/3 104/9	environment [1] 56/3
drinking [1] 56/14	education [3] 107/15 107/23 108/9	environmental [1] 9/
drive [1] 109/3	educational [2] 6/10 7/10	equilibrium [2] 99/15
driven [1] 10/22	effect [1] 128/10	equivalent [1] 112/20
drives [1] 11/1		
	effective [4] 27/2 27/4 27/9 37/21	especially [1] 168/8
driveway [5] 198/18 202/13 202/22		essential [1] 19/6
203/9 203/11	effects [1] 37/22	essentially [17] 6/17
drop [16] 29/15 29/23 30/1 30/22	efficiencies [1] 26/20	19/1 30/16 31/23 38/
50/8 53/18 53/21 54/3 78/23 79/1	efficiency [1] 68/9	47/22 58/17 65/5 76/
80/5 80/22 80/22 91/5 91/7 94/10	efficient [1] 26/18	115/7 129/12 150/16
drum [2] 186/6 191/12	efficiently [1] 103/16	establish [3] 97/11 93
dry [1] 14/1	Eisenberg [17] 120/11 120/25	established [2] 116/8
due [2] 103/18 155/12		
	124/21 128/9 129/12 134/7 137/4	establishes [1] 100/1
duly [3] 4/21 105/25 195/17	138/1 139/3 141/6 143/15 157/9	Europe [1] 113/18
dumped [1] 193/1	157/22 160/7 160/14 161/13	evaluate [2] 17/22 12
duration [1] 205/4	163/25	evaluation [1] 15/25
during [15] 13/13 42/23 64/9	Eisenberg's [9] 121/3 121/12 126/2	even [30] 15/5 29/4 3
70/16 70/17 82/16 104/23 127/9	126/13 138/17 142/11 149/12	41/3 45/1 49/5 50/2
129/7 145/5 176/6 204/17 205/15	157/12 189/13	63/25 92/6 92/18 96/
206/2 206/20	either [14] 11/13 28/7 28/9 58/19	100/3 101/4 115/1 12
dust [1] 171/18	58/23 92/11 112/10 122/2 124/21	135/13 141/20 143/9
duties [2] 14/23 167/5	148/18 154/21 155/3 197/13 202/7	
dwellings [1] 161/24	elected [1] 7/3	202/15 203/22
E	electronic [3] 46/4 53/1 118/17	evenly[1] 131/14
	electronically [1] 35/6	event [5] 37/24 58/25
each [23] 25/2 26/24 26/24 33/24	electronics [1] 194/24	142/14
34/1 35/24 35/24 37/18 38/4 38/7	electrophoresis [1] 75/20	events [1] 143/11
38/12 46/23 69/24 69/25 73/14	Electrospray [1] 73/19	eventually [1] 143/15
75/21 142/7 142/8 166/23 194/19	element [2] 30/14 64/9	ever [6] 22/24 27/24
195/5 206/9 206/19	elements [4] 119/8 139/25 154/2	65/21 86/20
ear [3] 141/21 142/4 142/7		
	193/15	every [4] 21/3 38/7 1
earlier [5] 20/7 87/4 132/6 200/24	elicit [1] 52/19	everybody [2] 34/24
201/25	elicited [1] 146/4	everything [9] 13/11
early [5] 75/14 100/20 164/25	ELMO [2] 31/5 31/13	47/24 110/21 117/7 1
198/12 204/13	else [11] 31/9 40/23 47/24 102/8	192/21
easier [3] 71/11 86/2 88/13	122/7 146/23 193/5 194/4 197/25	evidence [27] 105/14
easiest [1] 186/10	202/2 202/8	116/4 117/8 117/13
easily [1] 155/4	else's [1] 18/18	138/15 143/16 144/2
easy [2] 155/8 186/11	elsewhere [3] 191/25 192/3 193/1	
		146/19 147/2 147/6 1
edges [1] 115/25	empirical [1] 121/25	150/1 150/2 150/15
editor [1] 111/17	empirically [2] 27/15 50/1	182/22 185/3 185/20
Editorial [2] 111/9 111/15	employ [1] 9/14	evidenced [2] 30/23 (
EDTA [169] 20/22 21/15 21/20	employed [6] 6/3 24/11 81/14	evidentiary [1] 37/19
21/21 22/19 22/21 22/22 23/6	106/24 106/25 108/20	exact [2] 33/1 54/2
23/12 23/15 23/17 23/17 23/18	employees [1] 205/17	exactly [17] 9/17 18/
23/20 24/11 24/23 25/2 25/3 25/8	employers [1] 205/17	22/20 34/22 42/12 52
26/23 27/10 28/7 28/9 28/14	employment [5] 6/23 7/2 8/23	101/11 104/18 111/1
28/16 28/23 29/2 29/2 29/6 29/11	14/20 205/15	128/12 150/7 165/19
29/14 29/15 29/24 30/2 30/3 30/8		
	encountered [2] 189/22 190/2	exam [3] 76/20 82/16
30/9 30/21 38/9 39/1 39/4 39/24 39/25 40/1 40/5 40/22 41/9 41/15	encounters [1] 113/11	examination [42] 2/4
* U / / S / U / L / U / S / U / J J / U / U / U / U / U / U	and [10] 23/16 131/1 132/11	2/11 2/12 2/13 2/1 <i>4</i>

end [10] 23/16 131/1 132/11

133/13 135/18 173/19 191/14

39/25 40/1 40/5 40/22 41/9 41/15

41/25 42/21 42/23 43/4 43/17

ded [2] 12/8 12/11 **is [1]** 131/19 ergy [8] 6/24 7/1 10/9 70/2 0/15 171/2 173/20 174/6 ergy's [1] 19/9 orcement [7] 109/18 112/5 4/23 156/13 164/2 196/14 200/3 land [1] 107/17 ough [9] 11/3 26/9 29/4 99/22 /24 150/21 183/23 184/9 186/19 ich [1] 110/24 sure [1] 10/24 suring [1] 11/1 ered [1] 35/22 ire [2] 31/24 68/11 irely [7] 53/22 77/12 92/1 7/11 147/12 147/12 187/16 rance [3] 122/16 183/2 183/6 ree [1] 62/8 ry [1] 38/12 /ironment [1] 56/3 /ironmental [1] 9/10 ilibrium [2] 99/15 99/17 uivalent [1] 112/20 ecially [1] 168/8 ential [1] 19/6 entially [17] 6/17 7/23 15/25 /1 30/16 31/23 38/7 42/6 42/14 /22 58/17 65/5 76/11 83/15 5/7 129/12 150/16 **ablish [3]** 97/11 97/13 98/8 ablished [2] 116/8 202/9 **ablishes [1]** 100/1 ope [1] 113/18 luate [2] 17/22 125/14 ı**luation [1]** 15/25 en [30] 15/5 29/4 30/23 40/7 /3 45/1 49/5 50/2 54/24 61/5 /25 92/6 92/18 96/6 96/18 0/3 101/4 115/1 128/3 130/16 5/13 141/20 143/9 144/10 1/18 171/22 184/15 199/21 2/15 203/22 enly [1] 131/14 ent [5] 37/24 58/25 59/1 127/1 2/14 ents [1] 143/11 entually [1] 143/15 er [6] 22/24 27/24 60/20 65/18 /21 86/20 ery [4] 21/3 38/7 119/12 167/13 erybody [2] 34/24 67/8 erything [9] 13/1 17/6 17/19 /24 110/21 117/7 119/16 142/16 2/21 dence [27] 105/14 112/9 112/10 6/4 117/8 117/13 129/5 138/3 8/15 143/16 144/21 146/1 6/19 147/2 147/6 147/22 149/5 0/1 150/2 150/15 150/16 151/25 2/22 185/3 185/20 186/1 189/11 denced [2] 30/23 63/20 dentiary [1] 37/19 ict [2] 33/1 54/2 actly [17] 9/17 18/9 18/14 19/6 /20 34/22 42/12 52/25 87/14 1/11 104/18 111/15 112/1 8/12 150/7 165/19 185/14 **m [3]** 76/20 82/16 90/16 examination [42] 2/4 2/5 2/6 2/7 2/11 2/12 2/13 2/14 2/16 2/17 2/18 2/19 2/21 2/22 2/23 2/24 5/7

98/1 102/14 102/18 102/21 102/23 148/22 150/19 155/16 159/7 Ε 159/24 176/15 193/5 103/5 examination... [25] 5/23 64/17 explain [2] 6/21 198/13 Fallon's [1] 158/24 64/22 89/6 95/23 102/11 103/25 **explaining [2]** 106/15 133/2 familiar [9] 16/4 16/7 47/1 65/9 106/8 107/20 145/20 147/24 120/10 120/14 163/8 169/8 188/5 **explanation** [1] 180/25 149/18 155/17 157/25 158/24 exploded [1] 171/23 family [2] 204/21 206/15 159/19 160/10 176/17 188/22 explore [1] 64/24 far [15] 40/22 45/20 80/11 91/2 193/7 195/22 198/8 201/16 201/18 expose [1] 186/20 98/6 102/21 114/7 128/20 129/3 203/18 exposed [12] 55/19 172/8 172/15 129/17 139/5 140/22 149/10 examinations [1] 6/19 173/23 177/13 178/7 178/13 205/2 153/13 186/14 examine [8] 17/21 100/22 111/19 205/22 205/25 206/13 206/24 fashion [3] 33/7 104/23 131/4 115/4 134/24 164/3 183/24 184/20 fast [2] 73/18 128/2 exposure [6] 172/3 172/6 172/19 examined [10] 4/22 61/10 61/12 182/4 186/19 205/24 faster [1] 172/8 101/25 106/1 144/14 160/15 fastest [1] 60/19 express [7] 21/25 54/8 61/8 98/13 160/20 160/23 195/18 145/19 165/19 166/16 fat [1] 175/19 examiner [2] 111/11 125/16 expressed [7] 47/17 48/19 145/25 fats [1] 175/15 FBI [18] 20/12 20/21 21/7 27/24 **Examiners** [1] 111/8 146/6 146/10 149/12 157/6 **examining [1]** 184/16 expressing [3] 157/5 157/20 160/4 44/6 52/2 56/4 71/3 72/24 73/10 example [11] 9/18 11/17 13/13 expursed [1] 172/14 75/7 75/9 81/14 94/7 94/19 96/4 49/3 62/22 116/20 117/10 125/23 extent [2] 66/12 177/13 98/18 101/25 130/7 139/24 175/8 exterior [4] 126/23 175/6 183/12 FBI's [7] 70/10 75/23 77/16 77/24 **excavating [1]** 133/15 183/13 82/3 98/8 102/5 excavation [8] 120/7 129/3 129/8 exteriors [1] 161/24 fear [1] 146/9 130/6 133/3 133/11 133/14 141/2 extra [1] 130/18 February [5] 33/16 33/23 49/12 except [1] 135/16 extract [23] 26/16 26/23 34/9 57/25 60/18 **exception** [1] 179/19 36/19 36/22 39/7 39/14 40/9 February 16 [1] 49/12 **exclude [6]** 97/20 143/20 144/20 40/14 41/1 41/10 41/15 41/24 February 26 [1] 60/18 147/9 149/4 190/25 45/3 45/8 45/12 45/15 87/24 88/4 federal [4] 8/15 9/8 9/13 11/5 excluded [1] 149/8 88/7 92/20 93/9 94/25 feel [1] 88/18 extracted [1] 89/24 extracting [3] 25/16 26/4 50/25 extraction [6] 26/20 37/5 70/16 **excluding** [1] 149/2 feet [1] 180/21 exclusively [2] 8/25 9/1 fellow [1] 111/5 excuse [5] 19/25 45/14 158/6 female [9] 121/8 182/19 186/8 197/7 197/12 202/12 202/16 170/23 195/12 70/18 75/18 75/23 excused [9] 145/6 145/15 145/16 extractions [2] 26/17 26/22 202/20 203/6 158/7 158/8 176/6 194/6 204/4 extreme [1] 132/12 few [12] 31/4 44/17 48/12 88/8 206/25 extremely [1] 130/22 102/9 118/6 123/10 124/17 135/24 exercised [1] 167/4 158/7 160/20 207/3 eye [4] 153/25 154/1 154/6 155/4 **exhibit [23]** 7/5 7/6 20/9 20/19 field [13] 13/2 74/6 99/20 111/4 113/1 113/4 113/7 114/16 126/9 21/1 31/13 32/18 32/24 33/11 33/18 33/19 49/12 59/18 73/16 F-a-i-r-g-r-i-e-v-e [1] 106/7 129/14 151/13 153/23 166/13 74/16 74/18 107/6 198/11 199/20 fabric [1] 191/15 figure [1] 24/20 199/22 201/2 207/6 207/10 file [6] 35/4 35/6 46/4 46/12 49/20 face [1] 132/2 Exhibit 434 [1] 20/19 facial [2] 141/11 141/19 53/1 Exhibit 435 [1] 20/9 fact [54] 12/5 12/24 12/24 18/3 filed [2] 146/7 148/4 Exhibit 436 [1] 73/16 21/19 28/19 30/10 30/16 37/2 files [2] 84/1 157/7 40/7 43/20 53/23 55/2 63/21 Exhibit 437 [1] 74/18 final [5] 125/17 132/20 140/19 Exhibit 446 [1] 21/1 96/16 98/18 98/20 113/6 121/6 157/21 206/22 Exhibit 501 [2] 107/6 207/6 122/21 132/13 134/23 139/19 finally [4] 33/19 59/16 63/11 143/8 149/20 152/9 152/23 153/5 exhibits [6] 3/1 20/6 68/20 73/14 101/15 105/14 105/18 153/12 165/13 166/23 167/13 find [29] 17/2 31/1 31/6 42/21 exit [1] 183/10 171/22 172/6 173/14 174/14 175/3 44/4 55/10 66/25 67/1 80/9 81/6 EXP[1] 60/8 175/17 178/5 178/15 179/11 81/7 82/7 83/19 88/20 99/10 **expands** [1] 127/20 182/11 182/21 183/23 184/23 99/11 113/13 119/13 119/20 122/7 expect [8] 7/21 38/19 72/23 92/2 186/1 186/12 193/14 193/20 130/12 133/21 140/5 140/7 150/7 99/11 146/18 147/7 174/14 196/22 199/20 200/1 200/6 200/24 167/11 191/4 193/9 202/20 expected [5] 51/11 104/11 147/15 factor [2] 103/2 168/8 finding [3] 117/5 130/11 141/12 factors [1] 26/7 faculty [1] 109/5 149/11 189/19 findings [2] 112/9 165/5 expensive [1] 11/21 finds [1] 43/24 experience [27] 7/12 7/15 8/24 Fahrenheit [4] 169/25 170/6 fine [4] 84/4 85/3 194/13 200/21 10/6 10/16 11/7 13/11 65/1 65/1 170/17 170/18 finger [1] 179/13 66/4 67/4 67/6 67/7 67/9 96/13 fail [2] 143/20 147/8 fingers [1] 131/19 100/21 140/4 141/14 142/23 fair [5] 71/13 149/13 156/9 165/18 | finish [2] 57/4 176/19 151/14 152/19 152/25 154/20 169/12 fire [17] 110/7 127/1 127/11 156/6 166/19 191/4 191/10 FAIRGRIEVE [13] 2/10 105/21 127/24 127/25 128/1 131/22 **experiment** [1] 80/10 105/24 106/7 106/14 145/8 145/22 142/15 143/2 171/8 175/13 175/16 experimentation [3] 127/21 189/23 146/5 146/18 148/9 149/11 151/12 177/25 178/1 178/3 185/5 193/10 188/24 fires [2] 128/4 168/22 190/3 expert [5] 107/22 145/22 148/4 Fairgrieve's [1] 207/7 firmly [1] 205/20 148/7 156/21 fairly [4] 44/9 128/19 154/12 first [36] 4/21 6/9 7/15 11/9 26/21 expertise [2] 7/11 117/11 160/13 31/15 31/16 34/23 36/9 38/3 49/2 expiration [21] 56/14 57/14 57/17 **fall [1]** 133/18 60/10 64/24 69/11 105/25 109/21 57/22 58/2 60/5 66/3 67/13 67/16 FALLON [16] 1/13 2/12 2/14 2/17 112/22 114/23 116/3 118/11 119/14 128/17 129/5 145/24 67/18 68/3 68/5 68/9 68/15 97/24 2/19 4/8 73/13 145/12 145/17

F	fractures [5] 127/1 127/4 127/7	172/21 177/14
first [12] 149/17 155/23 155/25	127/8 136/4 fracturing [5] 127/15 127/22 128/5	generates [1]
156/3 164/22 174/25 175/5 175/8	135/24 136/3	gentleman [2] 124/19 165/16
195/6 195/17 199/1 205/7	frag [1] 70/2	gentlemen [1] 194/15
firstly [1] 138/23	fragile [4] 130/22 131/2 132/8	germane [1] 159/18
five [4] 29/17 57/4 57/6 145/25	132/19	gets [3] 5/7 21/23 89/16
fixed [1] 131/4	fragility [2] 131/9 132/4	getting [6] 26/8 78/7 117/19 119/9
flag [2] 116/19 117/17	fragment [6] 117/15 119/12	159/2 206/7
flags [1] 117/24	123/19 123/20 152/21 182/13	girlfriend [2] 194/18 195/4
flame [7] 172/17 172/21 174/15 174/17 174/18 174/18 174/19	fragmentary [1] 141/19 fragmentation [1] 182/7	give [11] 36/6 107/7 109/4 110/21 110/21 117/15 143/13 189/4 189/8
flaunts [1] 52/14	fragmented [2] 70/3 179/25	197/24 202/15
flesh [1] 190/10	fragments [25] 70/5 119/5 119/6	given [9] 21/16 62/20 77/13 84/13
flip [2] 35/25 48/11	126/20 126/24 128/11 137/6	117/7 136/16 143/15 167/10
floor [1] 133/25	137/17 137/20 138/10 138/20	177/20
flour [2] 8/3 171/22	140/25 141/13 153/5 153/19	gives [1] 78/15
focusing [1] 25/23 folks [1] 118/25	160/14 161/13 181/15 189/21	giving [2] 63/7 150/13
follow [8] 14/15 18/5 18/9 18/13	191/15 191/24 192/6 192/7 192/10 192/13	gizmo [1] 10/21 glass [4] 80/21 133/25 134/2 134/2
18/20 102/9 103/24 142/16	frame [2] 61/3 203/23	glue [1] 131/5
follow-up [2] 14/15 102/9	frankly [1] 83/17	God [1] 149/23
follow-ups [1] 103/24	fraudulent [3] 12/19 13/12 14/4	goes [6] 40/22 47/20 117/25
followed [2] 18/3 111/21	free [11] 70/22 71/5 71/15 71/25	118/23 125/14 148/15
follows [6] 4/22 23/6 106/1 150/10		going [60] 17/25 18/10 18/14 20/6
195/2 195/18 food [1] 9/10	85/13 95/14	20/18 21/10 22/9 25/16 31/4
Fool's [1] 102/19	frequency [1] 48/9 frequently [1] 156/24	31/15 34/24 35/25 46/4 51/9 51/14 57/2 73/13 73/18 85/12
foot [2] 48/1 186/8	front [3] 7/6 60/15 84/15	93/19 103/1 104/21 107/9 111/12
force [1] 135/15	frozen [1] 59/17	116/10 118/12 124/15 131/6 131/6
foregoing [2] 208/7 208/7	fuel [17] 171/7 171/10 171/12	131/15 131/25 132/5 132/18
foremost [1] 119/15	171/12 172/3 173/12 174/8 175/12	133/18 134/4 140/13 143/10
forensic [47] 14/23 15/11 15/14	175/15 175/15 177/3 177/9 177/14	143/10 145/4 145/20 150/9 150/12
106/23 107/1 107/3 108/18 108/21 109/6 109/12 109/13 109/13	178/2 189/18 190/11 190/12	150/20 153/14 154/11 158/5
109/15 109/12 109/13 109/13	fuels [1] 172/23 full [2] 145/24 146/8	158/14 158/14 159/8 165/19 170/5 176/4 193/22 198/21 200/13
110/15 111/6 111/8 111/11 112/7	fully [2] 149/10 178/7	200/13 200/14 202/24 204/9
114/20 114/25 115/9 117/9 120/17	functioning [1] 62/25	204/13
122/13 122/24 124/4 125/1 125/5	funded [1] 7/1	gone [2] 63/25 132/8
125/15 125/18 126/9 129/11 136/9	funding [1] 7/3	good [30] 4/6 4/12 8/10 8/10
148/7 151/13 156/9 166/6 166/9 167/14 171/6 184/18 184/21 188/9	funeral [5] 175/18 175/20 177/17	10/25 11/3 11/4 17/8 18/10 23/16
188/10	177/21 178/18 furnace [2] 144/9 148/16	23/18 23/18 36/9 38/1 62/9 64/20 64/21 77/4 79/15 106/10 106/13
forensically [1] 167/20	further [5] 2/8 41/6 103/25 111/2	155/19 155/20 166/18 168/2
forget [1] 170/3	205/24	168/23 174/8 176/1 195/24 195/25
forgotten [1] 13/9	G	gosh [1] 30/5
form [27] 70/7 70/11 70/20 70/22		gotten [1] 196/18
70/22 71/2 71/15 71/25 76/4 76/4	GAHN [10] 1/15 2/5 2/7 4/10 5/1 5/7 64/16 96/1 101/15 102/8	government [13] 8/16 8/25 9/3 9/4
81/24 82/1 84/14 84/22 84/22 85/14 103/12 104/10 109/20 134/5	3/7 64/16 96/1 101/13 102/8 Gahn's [1] 96/25	9/13 9/15 10/4 11/5 11/6 12/20 14/4 14/14 16/1
155/10 155/12 157/7 164/8 167/23	gallon [2] 186/6 191/12	grade [1] 56/20
171/12 179/5	game [1] 149/13	graduate [1] 109/16
format [2] 167/14 167/14	gamut [1] 9/12	Grand [3] 200/8 201/4 201/5
forms [4] 70/14 71/14 72/11 76/10	garage [20] 136/21 137/21 138/10	grandma [2] 18/11 18/11
formulate [1] 166/15	138/13 138/19 139/7 139/12 141/9	grant [1] 150/12
formulating [1] 165/25 forth [2] 23/3 67/2	142/13 142/20 143/19 146/22 148/12 148/25 151/18 152/22	graphs [1] 92/19 grass [1] 99/21
found [37] 21/15 27/24 48/6 57/19	153/8 161/25 191/23 192/9	gravitated [1] 110/23
100/3 101/4 110/23 117/7 117/20	garbage [1] 154/15	gray [1] 132/9
119/17 127/20 128/24 128/25	gas [1] 171/16	gray-blue [1] 132/9
137/17 138/20 139/6 139/7 140/25	Gaseous [1] 171/15	great [8] 34/25 108/6 163/10
141/10 141/20 146/3 147/4 148/11	lasthor[11 135/23	163/14 174/12 174/20 179/6
151/17 152/21 153/6 153/7 153/21	gather [1] 135/23	
1 152 /21 154 /21 181 /2 184 /12	gave [2] 62/8 139/3	186/21
153/21 154/21 181/7 184/17 186/15 191/9 191/20 191/25	gave [2] 62/8 139/3 general [13] 4/8 15/15 37/9 55/20	186/21 greater [7] 139/4 181/23 182/2
153/21 154/21 181/7 184/17 186/15 191/9 191/20 191/25 192/11	gave [2] 62/8 139/3	186/21 greater [7] 139/4 181/23 182/2 182/6 182/8 186/1 193/20
186/15 191/9 191/20 191/25 192/11 foundation [2] 98/16 124/18	gave [2] 62/8 139/3 general [13] 4/8 15/15 37/9 55/20 106/24 108/15 108/18 115/4 138/12 153/6 161/25 170/14 177/23	186/21 greater [7] 139/4 181/23 182/2
186/15 191/9 191/20 191/25 192/11 foundation [2] 98/16 124/18 foundational [1] 73/11	gave [2] 62/8 139/3 general [13] 4/8 15/15 37/9 55/20 106/24 108/15 108/18 115/4 138/12 153/6 161/25 170/14 177/23 generally [7] 15/21 23/1 26/17	186/21 greater [7] 139/4 181/23 182/2 182/6 182/8 186/1 193/20 greatest [1] 139/5 grid [5] 118/8 129/6 130/8 167/14 167/23
186/15 191/9 191/20 191/25 192/11 foundation [2] 98/16 124/18 foundational [1] 73/11 four [9] 29/17 47/16 48/20 50/16	gave [2] 62/8 139/3 general [13] 4/8 15/15 37/9 55/20 106/24 108/15 108/18 115/4 138/12 153/6 161/25 170/14 177/23 generally [7] 15/21 23/1 26/17 79/21 118/13 127/3 165/23	186/21 greater [7] 139/4 181/23 182/2 182/6 182/8 186/1 193/20 greatest [1] 139/5 grid [5] 118/8 129/6 130/8 167/14 167/23 gridded [1] 167/21
186/15 191/9 191/20 191/25 192/11 foundation [2] 98/16 124/18 foundational [1] 73/11 four [9] 29/17 47/16 48/20 50/16 109/2 145/24 161/3 163/7 171/11	gave [2] 62/8 139/3 general [13] 4/8 15/15 37/9 55/20 106/24 108/15 108/18 115/4 138/12 153/6 161/25 170/14 177/23 generally [7] 15/21 23/1 26/17 79/21 118/13 127/3 165/23 generate [9] 13/19 18/2 118/21	186/21 greater [7] 139/4 181/23 182/2 182/6 182/8 186/1 193/20 greatest [1] 139/5 grid [5] 118/8 129/6 130/8 167/14 167/23 gridded [1] 167/21 grommets [2] 181/11 191/16
186/15 191/9 191/20 191/25 192/11 foundation [2] 98/16 124/18 foundational [1] 73/11 four [9] 29/17 47/16 48/20 50/16 109/2 145/24 161/3 163/7 171/11 fraction [1] 91/6	gave [2] 62/8 139/3 general [13] 4/8 15/15 37/9 55/20 106/24 108/15 108/18 115/4 138/12 153/6 161/25 170/14 177/23 generally [7] 15/21 23/1 26/17 79/21 118/13 127/3 165/23 generate [9] 13/19 18/2 118/21 165/24 173/4 173/7 174/5 174/12	186/21 greater [7] 139/4 181/23 182/2 182/6 182/8 186/1 193/20 greatest [1] 139/5 grid [5] 118/8 129/6 130/8 167/14 167/23 gridded [1] 167/21 grommets [2] 181/11 191/16 ground [2] 120/25 161/23
186/15 191/9 191/20 191/25 192/11 foundation [2] 98/16 124/18 foundational [1] 73/11 four [9] 29/17 47/16 48/20 50/16 109/2 145/24 161/3 163/7 171/11 fraction [1] 91/6 fracture [2] 128/3 133/16	gave [2] 62/8 139/3 general [13] 4/8 15/15 37/9 55/20 106/24 108/15 108/18 115/4 138/12 153/6 161/25 170/14 177/23 generally [7] 15/21 23/1 26/17 79/21 118/13 127/3 165/23 generate [9] 13/19 18/2 118/21 165/24 173/4 173/7 174/5 174/12 174/20	186/21 greater [7] 139/4 181/23 182/2 182/6 182/8 186/1 193/20 greatest [1] 139/5 grid [5] 118/8 129/6 130/8 167/14 167/23 gridded [1] 167/21 grommets [2] 181/11 191/16 ground [2] 120/25 161/23 grouping [1] 119/7
186/15 191/9 191/20 191/25 192/11 foundation [2] 98/16 124/18 foundational [1] 73/11 four [9] 29/17 47/16 48/20 50/16 109/2 145/24 161/3 163/7 171/11 fraction [1] 91/6	gave [2] 62/8 139/3 general [13] 4/8 15/15 37/9 55/20 106/24 108/15 108/18 115/4 138/12 153/6 161/25 170/14 177/23 generally [7] 15/21 23/1 26/17 79/21 118/13 127/3 165/23 generate [9] 13/19 18/2 118/21 165/24 173/4 173/7 174/5 174/12	186/21 greater [7] 139/4 181/23 182/2 182/6 182/8 186/1 193/20 greatest [1] 139/5 grid [5] 118/8 129/6 130/8 167/14 167/23 gridded [1] 167/21 grommets [2] 181/11 191/16 ground [2] 120/25 161/23

hers [1] 18/13 134/10 134/21 140/13 142/16 G 143/4 148/8 150/9 150/11 150/20 herself [2] 185/5 185/7 growth [1] 111/1 high [7] 70/2 81/5 101/9 122/22 151/19 154/4 155/11 157/19 158/5 quarantee [1] 102/24 174/18 174/19 186/24 159/16 162/9 163/5 170/8 180/17 181/22 194/2 194/3 198/10 198/21 quess [11] 10/2 70/21 76/22 98/13 higher [7] 27/3 27/10 27/13 96/18 120/8 125/9 143/4 149/7 158/1 100/11 118/12 155/1 200/2 200/7 202/1 202/24 203/2 166/3 202/1 highest [7] 47/18 47/23 47/25 48/1 idea [5] 99/7 150/17 176/1 191/14 guesses [1] 22/4 48/8 117/1 130/9 191/19 guessing [1] 61/24 highly [1] 10/14 ident [2] 117/6 117/9 gun [1] 122/12 Highway [1] 196/17 identifiable [1] 142/2 gunshot [8] 122/10 123/1 124/5 hire [1] 8/7 identification [7] 33/18 35/4 67/3 124/12 125/23 126/3 126/6 182/22 82/14 87/15 109/23 115/10 hit [1] 102/18 hold [1] 109/6 hole [1] 123/25 quys [1] 170/3 identified [8] 24/12 36/21 37/11 50/12 55/2 116/15 130/8 155/4 н home [1] 34/13 identifies [1] 77/7 hair [1] 175/7 homogeneous [1] 90/25 identify [13] 7/8 20/8 21/2 23/9 Halbach [5] 199/3 201/1 201/5 23/17 25/8 37/23 73/14 116/17 **Hon [1]** 1/9 201/20 203/8 honest [1] 159/9 135/5 136/6 153/24 179/8 Halbach's [2] 93/15 95/10 honestly [1] 159/3 identifying [3] 11/15 40/8 133/3 Honor [12] 4/6 4/12 5/17 5/22 ignition [1] 175/21 half [9] 24/25 25/1 25/3 25/4 25/6 169/23 169/24 192/16 192/22 33/5 98/15 105/12 124/15 144/24 iliac [1] 137/7 hallway [1] 145/9 158/3 200/17 207/5 ilk [2] 117/16 131/5 hand [7] 4/19 9/16 9/16 73/13 hope [2] 38/20 76/18 images [1] 162/9 105/23 143/2 149/9 hopeful [1] 110/18 imagine [5] 160/12 168/6 168/18 **hands [1]** 65/1 host [1] 166/24 179/20 186/11 hands-on-experience [1] 65/1 immediately [1] 205/24 hot [1] 174/10 handwriting [2] 38/5 44/11 hour [2] 109/2 169/23 impact [2] 178/24 178/24 handwritten [2] 87/18 88/11 hours [1] 169/24 implement [1] 130/14 happen [4] 28/6 119/22 127/16 implements [1] 130/15 house [1] 127/25 196/20 houses [1] 43/3 implied [1] 104/5 happened [7] 13/1 32/5 123/8 however [19] 15/22 25/12 38/21 important [16] 8/5 8/6 8/19 8/20 150/3 180/25 196/24 197/13 10/4 17/10 18/5 80/13 80/15 45/12 52/1 97/10 109/9 112/14 happening [1] 37/24 114/4 118/16 121/19 121/24 80/16 110/25 168/7 177/4 196/13 happens [4] 9/17 127/18 165/16 124/14 128/4 128/6 133/17 184/2 206/8 206/16 173/22 184/3 197/23 importantly [3] 156/7 172/3 hard [5] 10/7 10/10 10/15 53/23 Hudson [1] 113/20 177/12 185/8 huh [1] 89/4 impose [2] 56/8 150/21 hash [1] 88/23 human [58] 107/21 107/22 108/11 imposed [2] 14/11 129/7 haven't [4] 47/1 93/22 104/6 109/14 109/15 109/21 110/6 110/7 imposes [1] 56/15 144/12 113/3 114/17 114/18 125/19 impossible [1] 144/21 having [11] 4/21 12/8 12/12 58/4 improper [2] 205/3 206/24 128/11 134/10 134/11 134/12 63/25 105/25 116/6 129/14 136/17 134/13 134/20 135/5 136/13 137/5 improve [1] 76/18 149/17 195/17 137/8 137/12 137/17 137/20 improvement [2] 76/1 76/2 **hazard [1]** 166/3 137/25 139/5 139/6 139/8 139/16 improvements [5] 75/9 75/14 head [9] 37/14 122/9 124/13 140/16 143/15 151/14 152/5 75/16 76/14 76/20 125/23 131/19 132/1 135/17 153/24 154/2 154/11 154/13 in [696] 135/18 185/7 154/14 154/18 155/5 169/13 172/1 in agreement [1] 122/9 heading [1] 46/1 176/20 178/7 178/12 179/6 179/11 inability [1] 61/15 hear [2] 86/24 203/24 179/21 179/24 179/25 180/19 inadmissible [1] 158/15 inappropriate [3] 12/10 19/4 68/12 heard [9] 69/19 111/14 118/1 180/25 186/14 190/8 191/11 118/24 128/9 128/9 203/20 203/23 192/24 193/10 inarticulate [1] 90/8 204/15 hundred [1] 180/21 inaudible [1] 122/5 hearing [1] 157/13 hundreds [1] 11/22 inch [4] 29/17 48/1 192/15 192/22 heat [24] 127/3 127/4 127/7 127/8 hypothesis [1] 58/11 include [3] 9/21 149/24 205/10 127/19 127/20 133/16 136/2 included [1] 10/2 154/21 172/4 172/7 172/8 172/19 includes [3] 32/1 33/15 179/18 173/24 174/12 174/21 175/10 I'II [1] 85/7 including [5] 109/12 141/20 191/8 177/13 178/7 178/13 179/7 182/4 I'm [110] 5/17 6/2 6/14 7/5 9/17 204/20 206/15 12/24 12/25 14/20 14/22 15/4 182/8 186/21 incomplete [1] 153/10 heated [1] 174/25 15/19 17/6 17/12 17/16 17/17 inconsistent [4] 84/8 96/11 96/12 heating [5] 17/11 126/25 127/16 20/6 20/18 22/2 24/8 31/4 31/15 187/16 135/25 175/7 32/17 34/24 35/25 51/20 53/13 incorrect [2] 97/21 97/23 Height [1] 126/17 57/11 61/23 61/23 65/11 66/8 incorrectly [1] 97/16 **held [1]** 5/18 66/15 69/1 70/6 70/8 70/8 70/21 indeed [1] 166/22 help [3] 60/1 157/3 193/17 71/2 73/13 73/18 73/25 74/22 independent [3] 6/4 14/22 138/3 helpful [7] 82/10 82/22 84/2 93/24 79/7 79/9 81/4 82/8 82/9 82/15 indicate [6] 38/23 51/25 82/4 149/9 149/10 150/5 85/12 85/17 85/22 89/10 89/18 117/9 134/25 145/12 89/18 90/7 92/21 93/19 94/18 helps [4] 83/24 118/21 133/6 indicated [8] 44/22 44/24 92/7 133/6 101/1 105/13 107/22 109/9 110/18 92/16 97/25 122/10 197/23 198/15 hence [1] 123/16 111/5 111/7 111/9 111/12 112/16 indicates [3] 24/10 38/24 53/20 **Here's [1]** 94/11 112/16 112/16 113/2 113/15 114/1 indicating [2] 116/19 121/17 hereby [1] 208/6 115/8 116/17 122/10 124/11 indication [10] 23/18 27/23 28/2 herein [3] 4/21 105/25 195/17 124/15 128/12 128/15 132/3 39/1 44/13 45/23 48/4 78/16 86/8

I	International [1] 111/9 internet [2] 204/24 205/9
indication [1] 98/22	interpose [1] 124/16
individual [10] 38/13 119/5 121/8	interpret [3] 45/9 113/8 148/23
121/8 121/9 126/16 126/16 138/8	interpretation [6] 28/21 47/5 52/4
152/24 184/24 individually [1] 206/21	110/6 110/16 138/25
induced [3] 127/4 127/7 127/8	interpreted [1] 149/2 interrupted [1] 158/23
industry [1] 34/7	intersection [6] 198/17 199/11
infer [4] 27/18 51/9 51/24 88/9	199/12 199/23 200/1 201/11
inference [1] 138/25	interview [4] 196/6 196/7 196/25
influence [2] 177/7 177/8	197/6
information [31] 27/18 31/3 45/9 52/19 115/1 144/1 150/10 157/4	interviewed [1] 196/5 interviews [1] 197/1
159/3 159/15 159/17 160/3 162/25	introduce [1] 16/21
	introduced [2] 42/15 70/1
196/15 196/20 196/23 202/20	introducing [1] 109/12
203/4 203/13 205/11 205/13	introduction [2] 69/19 109/13
205/22 206/11 206/13 206/17	inventory [1] 138/6
206/24 informed [1] 129/9	investigating [1] 167/1 investigation [5] 12/18 106/20
ingredients [1] 18/13	114/24 160/25 198/12
	investigations [1] 14/10
161/8 178/23	INVESTIGATOR [6] 2/15 2/20
initially [4] 44/15 114/22 127/18	195/14 195/16 199/10 200/6
137/8	investigators [1] 203/6
initials [6] 38/6 38/16 41/21 44/14 44/17 51/7	invited [1] 109/19 involuntarily [1] 205/22
initiated [1] 115/6	involved [9] 7/16 8/24 12/19 110/
inject [4] 24/22 26/1 26/10 78/18	129/13 130/4 133/13 139/16
injected [5] 37/5 87/22 87/23	167/22
87/25 89/22	involving [1] 193/10
injecting [3] 25/13 37/1 89/14 injection [2] 86/11 87/20	ion [41] 41/8 48/8 49/6 51/18 52/5 52/7 52/14 68/23 69/6 69/11
inside [4] 115/8 183/8 183/9	69/12 70/6 70/12 70/20 71/3
187/22	71/13 71/24 72/4 72/10 72/18
instance [7] 11/6 35/9 51/23 81/18	73/19 76/9 81/22 82/1 82/17
101/3 139/24 177/2	82/18 83/3 83/9 84/21 85/6 85/13
instances [2] 118/16 143/9 instead [4] 50/24 75/20 82/22	86/8 86/13 86/17 86/17 89/6 92/23 92/24 93/16 93/16 95/14
88/16	ions [14] 46/21 47/2 47/4 47/4
instruct [1] 109/11	47/7 47/12 47/14 48/18 49/2
instrument [35] 13/20 13/21 24/5	50/16 69/14 69/15 72/1 92/8
24/20 24/23 25/14 25/18 25/19	iron [10] 70/19 70/23 71/15 72/11
26/10 27/2 31/24 32/6 34/11 35/17 37/2 37/6 47/13 62/6 62/12	72/22 76/4 83/11 84/22 85/14 95/15
62/18 63/9 69/13 69/22 78/7	issue [6] 23/13 53/7 145/13 165/4
78/14 78/18 82/6 84/13 87/22	182/21 183/18
87/23 87/25 89/14 89/17 89/23	issues [3] 27/1 75/21 166/24
100/18	item [5] 37/11 39/22 117/10
instrument's [2] 34/14 35/5 instrumental [1] 101/13	177/10 179/21 items [7] 116/15 117/10 141/3
instrumentation [3] 17/17 22/5	141/4 179/9 187/11 191/16
24/18	itself [8] 136/4 138/24 138/24
instruments [5] 16/6 16/11 16/14	143/2 172/4 175/12 181/17 199/1
16/25 34/7 insufficient [1] 97/13	J
insurre[1] 10/18	Janda [4] 136/24 137/18 139/7
integrity [5] 13/6 66/10 67/11	153/7
67/22 68/1	JANINE [4] 2/3 4/18 4/20 5/11
intended [7] 18/24 43/11 43/14	January [1] 208/15
67/21 103/7 103/10 148/19 intense [1] 126/25	jar [1] 66/14 jeans [1] 180/9
intense [1] 175/4	JEROME [2] 1/19 4/13
interaction [2] 66/12 70/18	job [4] 7/4 10/10 10/15 10/22
interest [6] 104/12 110/4 113/3	Jodi [2] 194/17 195/4
113/5 125/19 130/8	joined [1] 119/25
interested [5] 11/18 12/3 120/1 120/3 171/8	joining [1] 195/9 journal [4] 73/17 74/3 110/12
interesting [1] 17/3	111/18
interfaced [1] 65/13	Judge [11] 1/10 5/4 145/18 163/2
interference [1] 91/21	176/16 194/13 195/10 198/7
interferences [1] 26/14	201/16 202/25 204/2

judgment [2] 122/15 167/4 jump [1] 185/4 jurisdiction [1] 125/13 juror [3] 205/18 206/4 206/23 jurors [7] 110/19 159/21 199/23 204/18 204/21 206/5 206/16 jury [33] 1/4 57/10 57/17 60/10 64/7 64/10 64/15 71/11 97/2 104/21 104/25 106/15 110/22 117/25 145/3 145/7 145/15 145/15 151/4 151/7 151/8 158/5 158/9 158/20 159/22 176/4 176/8 176/14 204/13 204/17 206/6 206/21 207/1 justice [1] 112/5 K

K-2 [6] 36/19 36/22 36/23 36/23 37/4 37/8 **K-3 [1]** 39/14 **K-4 [1]** 40/25 keep [4] 7/4 45/5 116/10 117/13 Ken [1] 4/9 KENNETH [1] 1/11 killed [1] 123/11 kind [29] 12/19 13/9 14/6 28/1 28/4 28/5 28/6 28/15 30/3 32/9 43/3 44/14 46/8 53/22 55/16 62/1 62/5 66/8 85/24 92/2 99/1 101/7 101/12 141/12 163/19 166/14 169/2 193/22 197/24 kinds [4] 16/11 16/14 32/9 32/13 **knowing [3]** 55/14 55/15 87/13 knowledge [6] 169/18 180/16 188/4 189/5 192/1 208/14 known [13] 32/1 42/7 42/19 43/4 56/16 56/20 80/6 98/9 109/1 111/5 111/10 118/19 120/15 knows [1] 149/23 **KRATZ [7]** 1/11 2/22 2/24 4/9 195/8 195/12 198/6

lab [25] 7/19 7/20 7/22 8/1 8/9 9/15 10/5 10/5 10/9 11/13 12/5 12/10 13/4 16/24 17/18 17/22 30/4 30/20 32/14 34/4 34/14 44/5 59/11 94/4 101/4 lab's [2] 8/8 44/6 labbing [1] 14/1 label [2] 33/10 104/3 labeled [1] 34/10 laboratories [17] 6/24 7/22 8/3 8/25 9/3 9/5 9/7 9/8 9/8 9/19 9/21 9/23 10/12 12/1 12/20 14/8 15/25 laboratory [30] 6/2 7/25 8/11 8/17 11/20 11/24 12/1 12/15 13/14 16/18 17/2 17/8 17/11 18/17 19/9 20/21 21/7 29/7 29/22 30/11 32/3 45/21 49/18 58/19 59/6 61/14 61/19 70/10 73/11 83/13 Laboratory's [2] 20/12 52/2 labs [8] 8/15 9/9 11/8 14/12 15/9 15/15 16/2 43/6 lack [2] 21/24 121/14 **Ladies [1]** 194/15 land [4] 113/18 113/23 194/18 195/5 landmarks [1] 135/10 **Landscape [1]** 161/22 language [1] 149/9 large [9] 52/12 88/17 113/23 172/2 174/15 184/6 184/17 187/2 192/19 largely [2] 11/16 70/17

larger [6] 25/21 96/6 144/3 153/5 181/16 192/6 largest [2] 140/18 192/9 laser [4] 59/21 59/21 60/4 198/21 last [11] 5/10 49/11 52/17 52/18 53/14 60/18 106/5 163/19 195/20 199/9 200/19 lasts [1] 98/7 late [3] 15/14 60/16 87/4 later [4] 48/12 103/13 117/24 137/9 Laurentian [5] 106/16 107/1 108/21 108/24 109/7 lavender [3] 65/22 73/1 79/6 lavender-topped [3] 65/22 73/1 79/6 law [12] 1/17 1/19 109/18 112/4 112/10 114/23 156/12 164/2 166/15 166/16 196/14 200/3 lawyer [1] 170/8 lay [2] 62/4 67/7 layered [1] 133/3 laying [1] 178/18 **layperson** [1] 96/10 **LC [5]** 31/24 65/2 65/15 73/19 101/12 LC-MS-MS [1] 73/19 LC/MS [2] 31/24 101/12 LC/MS/MS [2] 65/2 65/15 leaching [1] 127/11 lead [2] 86/22 203/5 leading [1] 140/10 leads [2] 197/1 199/17 least [11] 56/11 62/25 137/2 137/23 152/10 163/6 171/11 182/22 189/20 199/10 201/9 leave [3] 117/24 158/21 204/14 leaves [2] 18/12 149/22 **LeBeau [9]** 19/20 20/15 24/10 41/20 57/24 61/10 61/21 63/13 96/21 LeBeau's [8] 29/14 45/2 45/4 47/7 50/6 58/6 97/19 104/17 led [1] 146/5 left [9] 9/16 35/1 47/20 85/24 85/25 153/12 160/2 178/17 183/24 legal [1] 166/11 legs [1] 135/19 lend [1] 138/24 length [2] 55/19 60/21 **lesion [2]** 122/18 123/23 **Leslie [2]** 120/10 120/15 less [4] 130/17 139/7 139/8 193/21 let's [25] 11/8 11/8 22/10 33/10 47/6 73/21 95/25 95/25 120/8 120/8 127/24 133/11 139/2 139/2 144/2 144/23 144/23 151/2 158/2 162/25 166/18 178/10 183/15 183/17 200/22 **lets [1]** 41/13 **letter [1]** 21/5 level [34] 12/6 30/11 76/24 79/19 80/18 80/19 80/20 81/15 83/12 84/7 84/21 84/24 85/4 85/15 86/12 87/10 87/10 88/4 89/9 90/4 91/12 91/22 92/6 92/15 94/20 95/13 96/2 100/2 101/9 104/9 107/16 108/23 130/10 186/15 levels [5] 62/15 65/22 78/10 79/18 90/19 life [8] 56/4 56/8 98/23 98/24 99/1

99/3 108/16 124/14 light [2] 55/21 131/10 likelihood [3] 179/8 186/3 193/21 likely [4] 28/21 139/13 168/19 173/19 likewise [2] 73/3 73/5 limbs [1] 132/1 limit [57] 12/2 19/12 24/2 24/4 24/6 24/18 24/18 24/20 25/10 25/15 25/24 27/3 27/9 27/25 27/25 29/4 29/10 30/10 30/15 30/17 49/19 54/24 56/16 62/2 62/7 63/9 63/10 63/20 76/25 76/25 78/3 78/8 78/14 81/5 82/6 91/25 92/3 94/18 95/1 96/14 96/16 97/14 98/9 98/12 98/21 99/7 99/8 99/9 100/1 100/1 100/9 100/11 100/13 100/18 100/19 101/22 121/17 limitation [1] 27/5 limitations [3] 18/24 78/2 78/21 limited [1] 25/10 limiting [2] 96/1 103/2 limits [8] 15/1 25/19 25/20 27/16 62/9 62/13 78/5 100/22 line [8] 10/8 38/21 42/15 143/12 147/10 172/12 194/18 195/5 lined [1] 44/22 lines [1] 133/16 lipping [1] 121/19 liquid [11] 16/7 37/1 37/3 45/16 65/3 69/23 75/20 103/12 104/10 171/12 171/13 Lisa [1] 196/2 listen [3] 204/23 204/25 205/6 **listening [1]** 204/18 **Liter [1]** 170/23 literally [2] 112/1 123/6 litre [1] 24/14 little [33] 5/14 6/8 7/14 11/12 23/1 26/25 30/5 34/10 38/14 39/18 64/24 64/25 76/21 85/18 86/2 86/4 88/23 91/7 99/7 106/11 107/7 109/5 116/5 117/23 118/4 127/6 130/23 136/14 154/5 166/18 166/19 168/21 199/21 lives [1] 55/25 load [4] 34/9 171/7 172/3 178/2 local [3] 14/1 205/5 205/6 located [2] 109/2 201/10 location [27] 116/21 119/17 128/7 128/21 129/23 133/17 135/1 135/6 makes [6] 18/11 28/11 28/13 135/12 135/15 139/17 139/18 139/19 139/21 139/23 141/1 142/23 143/1 144/20 148/14 148/19 148/24 151/23 167/11 167/13 180/14 186/3 locations [7] 136/16 141/22 148/18 managed [2] 10/8 19/8 152/10 154/22 167/17 191/18 management [1] 10/21 LOD [5] 46/17 48/12 49/15 49/17 79/5 log [1] 117/14 logical [3] 135/21 175/25 185/3 logically [2] 133/23 152/10 logs [1] 205/10 long [10] 13/21 15/8 15/16 56/3 57/1 98/7 119/7 124/13 172/14 176/24 longer [6] 61/2 131/25 182/2 182/4 186/14 186/16 looked [19] 13/16 55/6 64/25 many [11] 13/23 15/10 15/10 26/7 68/20 68/22 71/22 81/13 90/3 92/14 92/19 92/23 126/19 142/14 121/3 142/6 142/22 143/11 162/20

144/12 180/8 187/13 188/16 189/12 192/15 looking [32] 8/15 17/6 17/11 17/13 17/16 17/17 21/3 27/21 40/5 45/5 46/22 48/25 51/21 53/1 66/15 69/14 69/17 70/7 70/8 70/21 71/14 76/3 81/21 83/19 84/21 85/3 85/13 135/7 136/7 154/7 171/4 172/12 looks [8] 21/3 35/3 38/14 57/13 83/6 118/8 156/8 163/11 lose [1] 26/25 losing [1] 127/12 lost [4] 7/3 175/9 193/25 194/3 lot [17] 8/17 18/8 62/3 63/3 66/20 66/23 66/25 67/2 81/8 83/8 83/18 99/21 127/21 131/18 186/16 186/24 196/22 lots [3] 11/21 11/21 66/19 low [7] 19/12 29/4 53/17 62/15 90/19 90/22 96/23 lower [4] 86/3 100/1 119/23 133/13 lowest [1] 116/24 lucky [1] 194/2 Luis [1] 6/12 lunch [2] 104/21 104/23 M's [1] 38/15 M.Phil [1] 108/4 ma'am [7] 67/17 72/13 82/15 87/17 94/16 95/20 103/20 machine [2] 26/2 208/10 made [16] 14/16 33/19 38/7 38/13 38/16 41/17 44/24 50/19 52/1 55/3 66/22 75/9 75/17 76/14 141/8 161/13 magnitude [1] 100/8

mail [1] 198/19 main [1] 199/11 maintained [2] 13/6 17/18 maintaining [1] 68/1 majority [7] 8/14 140/6 140/16 152/21 152/23 179/24 191/4 make [24] 8/6 8/19 11/3 17/13 18/7 60/9 68/8 90/9 93/2 97/1 98/19 111/20 123/15 125/17 135/17 138/15 138/25 140/11 170/5 178/2 178/6 200/12 200/15 206/23 28/15 53/11 135/21 making [11] 14/1 14/3 22/4 38/11 51/8 51/19 51/22 52/3 52/14 72/25 140/17 MAL [2] 41/15 41/21 managing [1] 177/25 manipulated [1] 120/4 manipulations [1] 17/7 MANITOWOC [2] 1/1 208/2 manner [7] 10/15 65/6 123/1 125/7 125/10 183/17 183/18 manufactured [1] 57/21 manufacturer [4] 57/22 66/21 67/19 102/22 manufacturer's [2] 98/1 103/8 manufacturers [2] 56/1 99/1 manufacturing [1] 9/11

M many... [2] 185/11 185/13 map [1] 118/22 mapped [2] 117/18 167/20 mapping [5] 117/23 118/1 119/4 119/5 167/14 Marc [2] 19/19 20/15 MARCH [6] 1/8 57/23 60/8 60/18 102/16 102/18 March '96 [1] 60/8 mark [9] 2/15 2/20 33/13 41/20 88/23 116/20 195/14 195/16 195/21 marked [10] 3/1 20/7 32/18 33/18 48/16 49/8 50/18 107/6 107/6 163/6 maroon [2] 202/4 202/5 mass [9] 16/9 32/11 52/4 65/3 70/1 70/4 75/22 75/22 75/22 master's [2] 107/16 108/1 material [6] 26/19 56/3 73/12 130/11 130/12 158/15 materials [10] 21/6 22/10 27/6 37/8 43/13 55/25 56/2 60/15 129/12 135/17 matter [23] 4/4 47/20 63/11 129/16 129/16 165/13 166/23 172/6 173/14 174/14 175/3 175/17 178/5 178/15 183/18 186/12 189/9 193/14 193/20 205/11 206/20 208/7 208/13 matters [2] 47/5 129/17 mature [1] 121/9 maybe [12] 6/21 31/1 71/9 79/15 92/7 92/18 106/10 137/6 146/14 160/17 168/23 197/14 meals [1] 154/16 mean [28] 9/15 10/3 15/11 21/21 29/7 30/6 36/20 48/3 63/6 63/7 72/20 80/3 81/1 81/6 96/9 99/9 99/15 101/18 118/7 122/3 124/23 132/3 147/18 148/23 153/25 154/5 185/4 200/12 meaning [4] 122/22 123/6 128/22 196/14 meaningless [1] 101/10 means [22] 18/18 28/15 29/9 30/17 43/20 56/11 59/3 62/12 63/8 78/7 78/13 81/1 81/7 99/12 99/18 103/15 118/18 123/12 131/2 152/12 166/9 171/1 meant [4] 13/25 112/7 146/16 159/8 measured [1] 47/24 measurement [3] 10/17 76/22 77/5 measures [1] 10/23 measuring [1] 171/2 meat [2] 23/2 131/24 media [2] 205/3 206/14 medical [1] 125/16 meet [5] 39/23 41/9 51/13 114/23 204/11 meets [2] 44/20 198/18 member [1] 111/7 members [10] 64/7 104/20 111/3 145/3 158/5 176/3 204/12 204/20 206/15 206/21 mention [3] 22/23 88/8 148/15 mentioned [6] 24/4 36/11 54/15 58/13 100/20 129/17 mentioning [1] 159/17 merging [1] 166/14

met [2] 66/22 197/3 metal [7] 70/23 70/23 71/15 84/22 85/14 95/15 191/16 method [42] 13/22 16/19 16/25 18/1 18/3 19/2 19/3 22/18 22/24 23/16 23/22 23/25 24/1 24/4 24/18 25/20 25/24 27/2 27/5 27/9 27/16 27/25 28/7 40/7 53/23 55/8 62/3 63/10 63/19 63/20 72/21 75/23 76/25 77/18 77/19 78/4 78/6 78/12 81/4 81/8 118/14 134/17 methodology [3] 77/17 77/20 79/17 methods [2] 19/15 82/4 Mexico [2] 6/14 14/25 microgram [1] 79/24 micrograms [2] 24/13 79/24 microliter [75] 29/15 29/23 30/1 30/7 30/8 30/9 30/21 30/25 46/17 48/12 49/24 49/25 50/8 50/12 50/21 50/25 51/1 51/12 53/12 53/18 53/21 54/3 54/6 59/13 61/15 63/22 63/23 78/23 79/1 79/8 79/11 79/19 79/23 79/25 80/2 80/5 81/15 81/17 81/19 82/11 83/4 83/12 84/6 84/20 84/24 85/4 85/15 86/12 86/18 86/21 87/1 87/9 87/10 87/20 88/4 89/9 89/21 90/4 90/13 90/20 91/3 91/4 91/16 91/17 91/18 91/22 92/6 92/15 94/9 94/20 95/13 95/16 96/2 96/6 96/23 microliters [10] 49/15 50/9 51/6 87/19 88/24 89/11 89/13 89/15 90/13 90/13 microphone [1] 5/13 microscopic [1] 182/12 middle [3] 141/21 142/4 142/7 might [15] 22/4 30/5 63/5 81/8 88/13 124/21 150/5 159/1 168/11 168/11 170/10 171/8 179/14 192/25 193/9 mike [1] 106/10 milk [2] 56/13 102/20 Milligrams [1] 24/14 millimeter [2] 141/21 142/8 million [11] 24/15 25/7 25/12 27/11 44/8 44/8 54/18 55/12 55/13 169/12 169/14 mimic [1] 190/8 mind [3] 44/21 162/10 197/25 mine [2] 31/12 131/24 minerals [1] 132/14 mining [1] 109/1 minute [8] 7/15 11/9 38/3 73/21 97/1 140/2 157/18 158/17 minutes [12] 33/25 34/1 57/5 57/7 64/6 64/12 123/11 135/24 151/3 158/7 195/6 207/4 minutest [1] 179/5 misleading [1] 150/11 missed [3] 47/11 141/4 192/2 missing [1] 50/16 misunderstanding [2] 69/7 89/10 mix [3] 56/9 56/16 98/19 mixed [1] 120/5 mixture [2] 69/20 177/10 mode [34] 68/23 69/7 69/11 69/12 69/13 70/6 70/12 71/3 71/13 71/24 72/4 72/10 72/18 76/9 81/22 82/17 82/18 83/3 83/10 84/21 85/6 85/13 86/13 86/17

93/17 95/13 95/14 96/7 152/14 modern [1] 107/25 modified [1] 167/10 molecules [1] 132/14 moment [13] 4/9 5/1 5/3 22/11 24/9 41/14 57/3 58/15 96/1 97/25 158/3 194/1 194/9 momentarily [2] 5/2 183/16 moments [1] 31/5 Monday [7] 162/5 196/8 196/11 197/10 197/13 197/21 206/23 money [1] 12/13 month [2] 56/15 98/9 months [4] 56/11 56/12 98/22 158/1 morning [11] 4/3 4/6 4/12 34/15 44/17 64/6 64/20 64/21 87/4 87/4 89/5 morning's [1] 64/8 most [11] 48/7 48/9 62/24 103/11 139/13 139/23 145/24 172/24 172/25 181/15 182/18 motivation [1] 153/13 move [6] 39/6 84/2 105/14 133/18 134/3 207/6 moved [33] 120/4 129/23 131/3 133/8 133/20 134/8 134/9 136/13 136/14 136/15 138/11 139/18 139/20 140/5 140/8 140/9 140/16 140/19 140/23 141/5 141/23 143/5 152/6 152/6 152/11 152/13 153/1 153/2 153/16 180/19 191/5 191/6 192/25 movement [3] 153/10 153/14 153/20 moving [2] 136/12 141/25 Mr [13] 47/6 47/7 57/1 63/22 87/5 96/21 102/2 104/16 155/16 158/23 189/3 193/5 194/4 **Mr. [69]** 4/14 5/1 5/7 5/20 24/10 45/2 45/4 45/16 50/3 50/6 50/24 51/5 54/9 54/23 55/3 55/11 56/25 57/19 57/24 58/6 59/5 59/13 61/10 61/16 61/18 61/21 63/13 63/24 64/16 68/19 69/9 72/9 73/13 79/12 86/21 86/25 95/21 96/1 96/25 101/15 102/8 104/2 105/10 137/20 138/12 138/19 145/17 146/11 148/22 150/19 151/10 151/18 152/22 158/10 159/7 159/24 176/15 188/20 194/7 194/10 194/20 195/8 195/12 195/12 195/24 198/6 198/10 199/5 204/6 Mr. Avery [4] 4/14 45/16 104/2 194/10 Mr. Avery's [22] 50/3 50/24 51/5 54/9 54/23 55/3 55/11 57/19 59/5 59/13 61/16 61/18 63/24 79/12 86/21 86/25 137/20 138/12 138/19 151/18 152/22 199/5 Mr. Buting [5] 5/20 68/19 69/9 72/9 95/21 Mr. Fallon [7] 73/13 145/17 148/22 150/19 159/7 159/24 176/15 Mr. Gahn [6] 5/1 5/7 64/16 96/1 101/15 102/8 Mr. Gahn's [1] 96/25 Mr. Kratz [3] 195/8 195/12 198/6 Mr. LeBeau [5] 24/10 57/24 61/10 61/21 63/13 Mr. LeBeau's [4] 45/2 45/4 50/6

86/17 89/6 92/24 92/24 93/16

М	non [1] 73/3	135/2 149/15 151/15 151/20
Mr. LeBeau's [1] 58/6	non-preserved [1] 73/3	152/12
Mr. Strang [9] 105/10 146/11	none [8] 29/3 54/14 101/18 149/11 179/22 185/23 185/24 207/9	148/7
151/10 158/10 188/20 194/7	nor [3] 146/24 187/4 204/19	offering [1] 115/12
194/20 195/12 204/6	Norm [1] 4/10	offhand [1] 161/11
Mr. Strang's [1] 56/25	normal [1] 46/7	office [5] 21/6 57/20 59/20 107/4
Mr. Wiegert [2] 195/24 198/10 Ms [19] 5/25 31/24 65/2 65/2	NORMAN [1] 1/15	113/16 officer [1] 161/7
65/15 65/15 73/19 73/19 101/12	north [1] 109/3 northern [3] 113/16 113/19 168/7	officers [10] 109/22 109/23 114/11
105/15 196/10 198/11 198/22	nose [2] 62/17 62/23	114/25 115/10 116/8 117/6 117/9
199/3 201/5 201/11 202/11 202/14		165/24 200/3
203/20	notably [2] 145/24 172/24	Official [3] 1/25 208/4 208/19
multiple [1] 26/22 murdered [1] 184/25	note [6] 18/7 42/11 75/8 76/20 119/12 121/14	officials [1] 114/23 often [3] 36/4 131/3 175/18
muscle [1] 184/7	noted [3] 46/11 68/21 119/10	oh [27] 31/17 47/11 48/25 49/1
mushel [1] 184/7	notes [6] 87/17 87/18 88/11 88/19	51/13 59/23 59/24 68/16 71/1
must [5] 28/16 47/11 59/3 120/15	88/24 208/9	71/4 76/17 83/8 87/12 115/17
141/14 myself [1] 189/22	noteworthy [1] 103/11 nothing [9] 28/24 68/7 77/8 84/17	115/19 119/2 121/3 136/8 136/11 144/4 155/6 165/15 174/11 174/19
	84/18 84/19 86/5 117/22 197/25	188/15 192/15 193/2
N	notice [2] 146/10 165/18	oil [1] 173/9
nail [2] 179/14 198/5	notify [1] 205/20	old [2] 54/9 57/18
naked [1] 153/25 name [10] 5/9 5/10 5/11 106/4	November [15] 144/16 162/5	on-site [3] 17/1 17/6 17/25
106/5 106/6 135/6 160/25 195/20	164/25 164/25 196/8 196/11 196/13 197/11 197/14 197/15	once [4] 41/7 53/9 83/17 175/14 ones [4] 51/21 75/5 155/6 167/22
195/20	197/22 201/23 201/23 202/23	online [1] 58/7
named [1] 196/2	203/8	only [34] 13/20 28/12 31/11 40/5
narrow [1] 197/19	November 1 [2] 197/14 201/23	51/24 58/13 58/20 58/21 68/21
national [2] 6/24 205/12 natural [4] 25/21 169/4 169/5	November 2 [3] 197/15 201/23 203/8	71/14 71/23 71/24 71/24 73/10 76/3 86/21 88/9 91/6 95/4 96/4
176/20	November 5 [1] 196/13	98/9 98/21 100/13 112/19 113/7
naturally [1] 128/6	November 7 [2] 196/11 197/11	137/5 142/14 142/15 180/20
nature [5] 11/12 18/4 171/5 172/2	November 7th [1] 197/22	180/24 183/18 184/6 197/19
176/25 Navy [13] 9/19 9/20 9/21 9/22	null [1] 99/16 number [13] 7/6 10/9 38/21 59/18	203/12 Ontario [8] 106/16 107/2 107/4
9/24 10/3 11/18 12/3 12/13 15/23	68/20 70/14 91/1 117/8 156/22	109/1 113/16 113/20 156/21 168/7
16/3 100/22 101/5	161/4 187/2 188/24 194/21	onto [3] 29/9 89/12 89/16
Navy's [2] 12/7 12/11	numbered [2] 33/6 119/9	open [1] 63/4
ND [4] 38/16 40/2 40/19 44/18		
Inear [5] 30/15 96/16 97/14 199/4	numbers [3] 33/8 140/22 170/9	opened [1] 59/20
near [5] 30/15 96/16 97/14 199/4 202/22	numerous [1] 160/13	opening [2] 122/19 123/22
202/22 necessarily [7] 38/24 101/20	numerous [1] 160/13 O	opening [2] 122/19 123/22 operate [1] 103/1 operated [4] 16/14 16/15 65/3
202/22 necessarily [7] 38/24 101/20 142/21 146/24 167/24 186/18	numerous [1] 160/13 O Obispo [1] 6/12	opening [2] 122/19 123/22 operate [1] 103/1 operated [4] 16/14 16/15 65/3 65/4
202/22 necessarily [7] 38/24 101/20 142/21 146/24 167/24 186/18 203/22	numerous [1] 160/13 O Obispo [1] 6/12 object [2] 200/17 202/24	opening [2] 122/19 123/22 operate [1] 103/1 operated [4] 16/14 16/15 65/3 65/4 operates [1] 9/4
202/22 necessarily [7] 38/24 101/20 142/21 146/24 167/24 186/18	numerous [1] 160/13 Obispo [1] 6/12 object [2] 200/17 202/24 objection [7] 98/15 105/16 105/17	opening [2] 122/19 123/22 operate [1] 103/1 operated [4] 16/14 16/15 65/3 65/4 operates [1] 9/4 operating [6] 8/9 20/20 69/13 92/2
202/22 necessarily [7] 38/24 101/20 142/21 146/24 167/24 186/18 203/22 neck [2] 135/19 168/6 need [6] 32/8 34/4 166/24 170/10 170/21 194/24	numerous [1] 160/13 Obispo [1] 6/12 object [2] 200/17 202/24 objection [7] 98/15 105/16 105/17 124/16 140/10 200/19 207/8 observation [1] 197/12	opening [2] 122/19 123/22 operate [1] 103/1 operated [4] 16/14 16/15 65/3 65/4 operates [1] 9/4 operating [6] 8/9 20/20 69/13 92/2 159/16 167/8 operation [1] 109/8
202/22 necessarily [7] 38/24 101/20 142/21 146/24 167/24 186/18 203/22 neck [2] 135/19 168/6 need [6] 32/8 34/4 166/24 170/10 170/21 194/24 needed [2] 68/17 189/7	numerous [1] 160/13 Obispo [1] 6/12 object [2] 200/17 202/24 objection [7] 98/15 105/16 105/17 124/16 140/10 200/19 207/8 observation [1] 197/12 observed [1] 183/19	opening [2] 122/19 123/22 operate [1] 103/1 operated [4] 16/14 16/15 65/3 65/4 operates [1] 9/4 operating [6] 8/9 20/20 69/13 92/2 159/16 167/8 operation [1] 109/8 operations [1] 8/8
202/22 necessarily [7] 38/24 101/20 142/21 146/24 167/24 186/18 203/22 neck [2] 135/19 168/6 need [6] 32/8 34/4 166/24 170/10 170/21 194/24 needed [2] 68/17 189/7 needs [1] 167/4	numerous [1] 160/13 Obispo [1] 6/12 object [2] 200/17 202/24 objection [7] 98/15 105/16 105/17 124/16 140/10 200/19 207/8 observation [1] 197/12 observed [1] 183/19 obtain [2] 108/13 161/14	opening [2] 122/19 123/22 operate [1] 103/1 operated [4] 16/14 16/15 65/3 65/4 operates [1] 9/4 operating [6] 8/9 20/20 69/13 92/2 159/16 167/8 operation [1] 109/8 operations [1] 8/8 opinion [43] 21/11 21/22 21/25
202/22 necessarily [7] 38/24 101/20 142/21 146/24 167/24 186/18 203/22 neck [2] 135/19 168/6 need [6] 32/8 34/4 166/24 170/10 170/21 194/24 needed [2] 68/17 189/7	numerous [1] 160/13 Obispo [1] 6/12 object [2] 200/17 202/24 objection [7] 98/15 105/16 105/17 124/16 140/10 200/19 207/8 observation [1] 197/12 observed [1] 183/19 obtain [2] 108/13 161/14 obtained [3] 27/19 159/18 162/3	opening [2] 122/19 123/22 operate [1] 103/1 operated [4] 16/14 16/15 65/3 65/4 operates [1] 9/4 operating [6] 8/9 20/20 69/13 92/2 159/16 167/8 operation [1] 109/8 operations [1] 8/8 opinion [43] 21/11 21/22 21/25 27/8 42/3 54/8 61/9 97/3 98/13
202/22 necessarily [7] 38/24 101/20 142/21 146/24 167/24 186/18 203/22 neck [2] 135/19 168/6 need [6] 32/8 34/4 166/24 170/10 170/21 194/24 needed [2] 68/17 189/7 needs [1] 167/4 negative [23] 36/9 36/15 69/3 69/6 69/15 71/13 72/4 72/10 72/18 76/9 82/1 82/7 82/18 83/3 83/9	numerous [1] 160/13 Obispo [1] 6/12 object [2] 200/17 202/24 objection [7] 98/15 105/16 105/17 124/16 140/10 200/19 207/8 observation [1] 197/12 observed [1] 183/19 obtain [2] 108/13 161/14 obtained [3] 27/19 159/18 162/3 obvious [3] 86/5 91/8 154/6 obviously [8] 14/3 52/22 55/5 67/7	opening [2] 122/19 123/22 operate [1] 103/1 operated [4] 16/14 16/15 65/3 65/4 operates [1] 9/4 operating [6] 8/9 20/20 69/13 92/2 159/16 167/8 operation [1] 109/8 operations [1] 8/8 opinion [43] 21/11 21/22 21/25 27/8 42/3 54/8 61/9 97/3 98/13 101/8 124/4 124/19 125/2 125/6 125/22 126/14 128/15 134/18
202/22 necessarily [7] 38/24 101/20 142/21 146/24 167/24 186/18 203/22 neck [2] 135/19 168/6 need [6] 32/8 34/4 166/24 170/10 170/21 194/24 needed [2] 68/17 189/7 needs [1] 167/4 negative [23] 36/9 36/15 69/3 69/6 69/15 71/13 72/4 72/10 72/18 76/9 82/1 82/7 82/18 83/3 83/9 84/21 85/6 85/13 86/13 86/17	numerous [1] 160/13 Obispo [1] 6/12 object [2] 200/17 202/24 objection [7] 98/15 105/16 105/17 124/16 140/10 200/19 207/8 observation [1] 197/12 observed [1] 183/19 obtain [2] 108/13 161/14 obtained [3] 27/19 159/18 162/3 obvious [3] 86/5 91/8 154/6 obviously [8] 14/3 52/22 55/5 67/7 108/7 108/18 161/22 175/6	opening [2] 122/19 123/22 operate [1] 103/1 operated [4] 16/14 16/15 65/3 65/4 operates [1] 9/4 operating [6] 8/9 20/20 69/13 92/2 159/16 167/8 operation [1] 109/8 operations [1] 8/8 opinion [43] 21/11 21/22 21/25 27/8 42/3 54/8 61/9 97/3 98/13 101/8 124/4 124/19 125/2 125/6 125/22 126/14 128/15 134/18 135/2 137/17 137/25 138/17
202/22 necessarily [7] 38/24 101/20 142/21 146/24 167/24 186/18 203/22 neck [2] 135/19 168/6 need [6] 32/8 34/4 166/24 170/10 170/21 194/24 needed [2] 68/17 189/7 needs [1] 167/4 negative [23] 36/9 36/15 69/3 69/6 69/15 71/13 72/4 72/10 72/18 76/9 82/1 82/7 82/18 83/3 83/9 84/21 85/6 85/13 86/13 86/17 92/24 93/16 95/14	numerous [1] 160/13 Obispo [1] 6/12 object [2] 200/17 202/24 objection [7] 98/15 105/16 105/17 124/16 140/10 200/19 207/8 observation [1] 197/12 observed [1] 183/19 obtain [2] 108/13 161/14 obtained [3] 27/19 159/18 162/3 obvious [3] 86/5 91/8 154/6 obviously [8] 14/3 52/22 55/5 67/7 108/7 108/18 161/22 175/6 occasion [1] 193/9	opening [2] 122/19 123/22 operate [1] 103/1 operated [4] 16/14 16/15 65/3 65/4 operates [1] 9/4 operating [6] 8/9 20/20 69/13 92/2 159/16 167/8 operation [1] 109/8 operations [1] 8/8 opinion [43] 21/11 21/22 21/25 27/8 42/3 54/8 61/9 97/3 98/13 101/8 124/4 124/19 125/2 125/6 125/22 126/14 128/15 134/18 135/2 137/17 137/25 138/17 139/11 142/12 142/19 143/13
202/22 necessarily [7] 38/24 101/20 142/21 146/24 167/24 186/18 203/22 neck [2] 135/19 168/6 need [6] 32/8 34/4 166/24 170/10 170/21 194/24 needed [2] 68/17 189/7 needs [1] 167/4 negative [23] 36/9 36/15 69/3 69/6 69/15 71/13 72/4 72/10 72/18 76/9 82/1 82/7 82/18 83/3 83/9 84/21 85/6 85/13 86/13 86/17 92/24 93/16 95/14 neither [3] 149/4 190/24 192/2	numerous [1] 160/13 Obispo [1] 6/12 object [2] 200/17 202/24 objection [7] 98/15 105/16 105/17 124/16 140/10 200/19 207/8 observation [1] 197/12 observed [1] 183/19 obtain [2] 108/13 161/14 obtained [3] 27/19 159/18 162/3 obvious [3] 86/5 91/8 154/6 obviously [8] 14/3 52/22 55/5 67/7 108/7 108/18 161/22 175/6 occasion [1] 193/9 occasions [1] 156/22	opening [2] 122/19 123/22 operate [1] 103/1 operated [4] 16/14 16/15 65/3 65/4 operates [1] 9/4 operating [6] 8/9 20/20 69/13 92/2 159/16 167/8 operation [1] 109/8 operations [1] 8/8 opinion [43] 21/11 21/22 21/25 27/8 42/3 54/8 61/9 97/3 98/13 101/8 124/4 124/19 125/2 125/6 125/22 126/14 128/15 134/18 135/2 137/17 137/25 138/17 139/11 142/12 142/19 143/13 145/25 146/5 146/9 146/15 147/5
202/22 necessarily [7] 38/24 101/20 142/21 146/24 167/24 186/18 203/22 neck [2] 135/19 168/6 need [6] 32/8 34/4 166/24 170/10 170/21 194/24 needed [2] 68/17 189/7 needs [1] 167/4 negative [23] 36/9 36/15 69/3 69/6 69/15 71/13 72/4 72/10 72/18 76/9 82/1 82/7 82/18 83/3 83/9 84/21 85/6 85/13 86/13 86/17 92/24 93/16 95/14 neither [3] 149/4 190/24 192/2 never [7] 17/4 32/6 55/9 112/14 144/14 147/9 188/16	numerous [1] 160/13 Obispo [1] 6/12 object [2] 200/17 202/24 objection [7] 98/15 105/16 105/17 124/16 140/10 200/19 207/8 observation [1] 197/12 observed [1] 183/19 obtain [2] 108/13 161/14 obtained [3] 27/19 159/18 162/3 obvious [3] 86/5 91/8 154/6 obviously [8] 14/3 52/22 55/5 67/7 108/7 108/18 161/22 175/6 occasion [1] 193/9 occasions [1] 156/22 occipital [1] 123/19 occupation [1] 5/25	opening [2] 122/19 123/22 operate [1] 103/1 operated [4] 16/14 16/15 65/3 65/4 operates [1] 9/4 operating [6] 8/9 20/20 69/13 92/2 159/16 167/8 operation [1] 109/8 operations [1] 8/8 opinion [43] 21/11 21/22 21/25 27/8 42/3 54/8 61/9 97/3 98/13 101/8 124/4 124/19 125/2 125/6 125/22 126/14 128/15 134/18 135/2 137/17 137/25 138/17 139/11 142/12 142/19 143/13 145/25 146/5 146/9 146/15 147/5 147/13 148/5 148/12 148/16 149/8 151/15 151/20 152/8 152/12
202/22 necessarily [7] 38/24 101/20 142/21 146/24 167/24 186/18 203/22 neck [2] 135/19 168/6 need [6] 32/8 34/4 166/24 170/10 170/21 194/24 needed [2] 68/17 189/7 needs [1] 167/4 negative [23] 36/9 36/15 69/3 69/6 69/15 71/13 72/4 72/10 72/18 76/9 82/1 82/7 82/18 83/3 83/9 84/21 85/6 85/13 86/13 86/17 92/24 93/16 95/14 neither [3] 149/4 190/24 192/2 never [7] 17/4 32/6 55/9 112/14 144/14 147/9 188/16 new [5] 6/13 14/25 54/15 54/16	numerous [1] 160/13 Obispo [1] 6/12 object [2] 200/17 202/24 objection [7] 98/15 105/16 105/17 124/16 140/10 200/19 207/8 observation [1] 197/12 observed [1] 183/19 obtain [2] 108/13 161/14 obtained [3] 27/19 159/18 162/3 obvious [3] 86/5 91/8 154/6 obviously [8] 14/3 52/22 55/5 67/7 108/7 108/18 161/22 175/6 occasion [1] 193/9 occasions [1] 156/22 occipital [1] 123/19 occupation [1] 5/25 occur [2] 135/25 168/19	opening [2] 122/19 123/22 operate [1] 103/1 operated [4] 16/14 16/15 65/3 65/4 operates [1] 9/4 operating [6] 8/9 20/20 69/13 92/2 159/16 167/8 operation [1] 109/8 operations [1] 8/8 opinion [43] 21/11 21/22 21/25 27/8 42/3 54/8 61/9 97/3 98/13 101/8 124/4 124/19 125/2 125/6 125/22 126/14 128/15 134/18 135/2 137/17 137/25 138/17 139/11 142/12 142/19 143/13 145/25 146/5 146/9 146/15 147/5 147/13 148/5 148/12 148/16 149/8 151/15 151/20 152/8 152/12 157/20 166/15 183/15
202/22 necessarily [7] 38/24 101/20 142/21 146/24 167/24 186/18 203/22 neck [2] 135/19 168/6 need [6] 32/8 34/4 166/24 170/10 170/21 194/24 needed [2] 68/17 189/7 needs [1] 167/4 negative [23] 36/9 36/15 69/3 69/6 69/15 71/13 72/4 72/10 72/18 76/9 82/1 82/7 82/18 83/3 83/9 84/21 85/6 85/13 86/13 86/17 92/24 93/16 95/14 neither [3] 149/4 190/24 192/2 never [7] 17/4 32/6 55/9 112/14 144/14 147/9 188/16 new [5] 6/13 14/25 54/15 54/16 60/22	numerous [1] 160/13 Obispo [1] 6/12 object [2] 200/17 202/24 objection [7] 98/15 105/16 105/17 124/16 140/10 200/19 207/8 observation [1] 197/12 observed [1] 183/19 obtain [2] 108/13 161/14 obtained [3] 27/19 159/18 162/3 obvious [3] 86/5 91/8 154/6 obviously [8] 14/3 52/22 55/5 67/7 108/7 108/18 161/22 175/6 occasion [1] 193/9 occasions [1] 156/22 occipital [1] 123/19 occupation [1] 5/25 occur [2] 135/25 168/19 occurred [4] 124/6 129/3 141/15	opening [2] 122/19 123/22 operate [1] 103/1 operated [4] 16/14 16/15 65/3 65/4 operates [1] 9/4 operating [6] 8/9 20/20 69/13 92/2 159/16 167/8 operation [1] 109/8 operations [1] 8/8 opinion [43] 21/11 21/22 21/25 27/8 42/3 54/8 61/9 97/3 98/13 101/8 124/4 124/19 125/2 125/6 125/22 126/14 128/15 134/18 135/2 137/17 137/25 138/17 139/11 142/12 142/19 143/13 145/25 146/5 146/9 146/15 147/5 147/13 148/5 148/12 148/16 149/8 151/15 151/20 152/8 152/12 157/20 166/15 183/15 opinions [7] 148/7 149/12 149/15
202/22 necessarily [7] 38/24 101/20 142/21 146/24 167/24 186/18 203/22 neck [2] 135/19 168/6 need [6] 32/8 34/4 166/24 170/10 170/21 194/24 needed [2] 68/17 189/7 needs [1] 167/4 negative [23] 36/9 36/15 69/3 69/6 69/15 71/13 72/4 72/10 72/18 76/9 82/1 82/7 82/18 83/3 83/9 84/21 85/6 85/13 86/13 86/17 92/24 93/16 95/14 neither [3] 149/4 190/24 192/2 never [7] 17/4 32/6 55/9 112/14 144/14 147/9 188/16 new [5] 6/13 14/25 54/15 54/16 60/22 news [5] 204/19 204/25 205/5 205/6 206/14	numerous [1] 160/13 Obispo [1] 6/12 object [2] 200/17 202/24 objection [7] 98/15 105/16 105/17 124/16 140/10 200/19 207/8 observation [1] 197/12 observed [1] 183/19 obtain [2] 108/13 161/14 obtained [3] 27/19 159/18 162/3 obvious [3] 86/5 91/8 154/6 obviously [8] 14/3 52/22 55/5 67/7 108/7 108/18 161/22 175/6 occasion [1] 193/9 occasions [1] 156/22 occipital [1] 123/19 occupation [1] 5/25 occur [2] 135/25 168/19	opening [2] 122/19 123/22 operate [1] 103/1 operated [4] 16/14 16/15 65/3 65/4 operates [1] 9/4 operating [6] 8/9 20/20 69/13 92/2 159/16 167/8 operation [1] 109/8 operations [1] 8/8 opinion [43] 21/11 21/22 21/25 27/8 42/3 54/8 61/9 97/3 98/13 101/8 124/4 124/19 125/2 125/6 125/22 126/14 128/15 134/18 135/2 137/17 137/25 138/17 139/11 142/12 142/19 143/13 145/25 146/5 146/9 146/15 147/5 147/13 148/5 148/12 148/16 149/8 151/15 151/20 152/8 152/12 157/20 166/15 183/15
202/22 necessarily [7] 38/24 101/20 142/21 146/24 167/24 186/18 203/22 neck [2] 135/19 168/6 need [6] 32/8 34/4 166/24 170/10 170/21 194/24 needed [2] 68/17 189/7 needs [1] 167/4 negative [23] 36/9 36/15 69/3 69/6 69/15 71/13 72/4 72/10 72/18 76/9 82/1 82/7 82/18 83/3 83/9 84/21 85/6 85/13 86/13 86/17 92/24 93/16 95/14 neither [3] 149/4 190/24 192/2 never [7] 17/4 32/6 55/9 112/14 144/14 147/9 188/16 new [5] 6/13 14/25 54/15 54/16 60/22 news [5] 204/19 204/25 205/5 205/6 206/14 newspaper [2] 204/24 205/7	Obispo [1] 6/12 object [2] 200/17 202/24 object [2] 200/17 202/24 objection [7] 98/15 105/16 105/17 124/16 140/10 200/19 207/8 observation [1] 197/12 observed [1] 183/19 obtain [2] 108/13 161/14 obtained [3] 27/19 159/18 162/3 obvious [3] 86/5 91/8 154/6 obviously [8] 14/3 52/22 55/5 67/7 108/7 108/18 161/22 175/6 occasion [1] 193/9 occasions [1] 156/22 occipital [1] 123/19 occupation [1] 5/25 occur [2] 135/25 168/19 occurred [4] 124/6 129/3 141/15 187/6 occurring [3] 127/14 162/13 178/16	opening [2] 122/19 123/22 operate [1] 103/1 operated [4] 16/14 16/15 65/3 65/4 operates [1] 9/4 operating [6] 8/9 20/20 69/13 92/2 159/16 167/8 operation [1] 109/8 operations [1] 8/8 opinion [43] 21/11 21/22 21/25 27/8 42/3 54/8 61/9 97/3 98/13 101/8 124/4 124/19 125/2 125/6 125/22 126/14 128/15 134/18 135/2 137/17 137/25 138/17 139/11 142/12 142/19 143/13 145/25 146/5 146/9 146/15 147/5 147/13 148/5 148/12 148/16 149/8 151/15 151/20 152/8 152/12 157/20 166/15 183/15 opinions [7] 148/7 149/12 149/15 157/5 160/4 165/19 165/25 opportunity [3] 19/19 135/4 164/3 opposed [2] 79/12 132/1
202/22 necessarily [7] 38/24 101/20 142/21 146/24 167/24 186/18 203/22 neck [2] 135/19 168/6 need [6] 32/8 34/4 166/24 170/10 170/21 194/24 needed [2] 68/17 189/7 needs [1] 167/4 negative [23] 36/9 36/15 69/3 69/6 69/15 71/13 72/4 72/10 72/18 76/9 82/1 82/7 82/18 83/3 83/9 84/21 85/6 85/13 86/13 86/17 92/24 93/16 95/14 neither [3] 149/4 190/24 192/2 never [7] 17/4 32/6 55/9 112/14 144/14 147/9 188/16 new [5] 6/13 14/25 54/15 54/16 60/22 news [5] 204/19 204/25 205/5 205/6 206/14 newspaper [2] 204/24 205/7 next [18] 4/16 29/13 35/8 36/15	Obispo [1] 6/12 object [2] 200/17 202/24 object [2] 200/17 202/24 objection [7] 98/15 105/16 105/17 124/16 140/10 200/19 207/8 observation [1] 197/12 observed [1] 183/19 obtain [2] 108/13 161/14 obtained [3] 27/19 159/18 162/3 obvious [3] 86/5 91/8 154/6 obvious [8] 14/3 52/22 55/5 67/7 108/7 108/18 161/22 175/6 occasion [1] 193/9 occasions [1] 156/22 occipital [1] 123/19 occupation [1] 5/25 occur [2] 135/25 168/19 occurred [4] 124/6 129/3 141/15 187/6 occurring [3] 127/14 162/13 178/16 occurs [3] 23/20 127/15 167/24	opening [2] 122/19 123/22 operate [1] 103/1 operated [4] 16/14 16/15 65/3 65/4 operates [1] 9/4 operating [6] 8/9 20/20 69/13 92/2 159/16 167/8 operations [1] 109/8 operations [1] 8/8 opinion [43] 21/11 21/22 21/25 27/8 42/3 54/8 61/9 97/3 98/13 101/8 124/4 124/19 125/2 125/6 125/22 126/14 128/15 134/18 135/2 137/17 137/25 138/17 139/11 142/12 142/19 143/13 145/25 146/5 146/9 146/15 147/5 147/13 148/5 148/12 148/16 149/8 151/15 151/20 152/8 152/12 157/20 166/15 183/15 opinions [7] 148/7 149/12 149/15 157/5 160/4 165/19 165/25 opportunity [3] 19/19 135/4 164/3 opposed [2] 79/12 132/1 options [2] 58/20 58/22
202/22 necessarily [7] 38/24 101/20 142/21 146/24 167/24 186/18 203/22 neck [2] 135/19 168/6 need [6] 32/8 34/4 166/24 170/10 170/21 194/24 needed [2] 68/17 189/7 needs [1] 167/4 negative [23] 36/9 36/15 69/3 69/6 69/15 71/13 72/4 72/10 72/18 76/9 82/1 82/7 82/18 83/3 83/9 84/21 85/6 85/13 86/13 86/17 92/24 93/16 95/14 neither [3] 149/4 190/24 192/2 never [7] 17/4 32/6 55/9 112/14 144/14 147/9 188/16 new [5] 6/13 14/25 54/15 54/16 60/22 news [5] 204/19 204/25 205/5 205/6 206/14 newspaper [2] 204/24 205/7 next [18] 4/16 29/13 35/8 36/15 37/15 39/14 40/9 45/25 48/22	Obispo [1] 6/12 object [2] 200/17 202/24 object [2] 200/17 202/24 objection [7] 98/15 105/16 105/17 124/16 140/10 200/19 207/8 observation [1] 197/12 observed [1] 183/19 obtain [2] 108/13 161/14 obtained [3] 27/19 159/18 162/3 obvious [3] 86/5 91/8 154/6 obvious [8] 14/3 52/22 55/5 67/7 108/7 108/18 161/22 175/6 occasion [1] 193/9 occasions [1] 156/22 occipital [1] 123/19 occupation [1] 5/25 occur [2] 135/25 168/19 occurred [4] 124/6 129/3 141/15 187/6 occurring [3] 127/14 162/13 178/16 occurs [3] 23/20 127/15 167/24 October [7] 194/16 195/3 197/13	opening [2] 122/19 123/22 operate [1] 103/1 operated [4] 16/14 16/15 65/3 65/4 operates [1] 9/4 operating [6] 8/9 20/20 69/13 92/2 159/16 167/8 operations [1] 109/8 operations [1] 8/8 opinion [43] 21/11 21/22 21/25 27/8 42/3 54/8 61/9 97/3 98/13 101/8 124/4 124/19 125/2 125/6 125/22 126/14 128/15 134/18 135/2 137/17 137/25 138/17 139/11 142/12 142/19 143/13 145/25 146/5 146/9 146/15 147/5 147/13 148/5 148/12 148/16 149/8 151/15 151/20 152/8 152/12 157/20 166/15 183/15 opinions [7] 148/7 149/12 149/15 157/5 160/4 165/19 165/25 opportunity [3] 19/19 135/4 164/3 opposed [2] 79/12 132/1 options [2] 58/20 58/22 order [18] 25/22 33/17 42/20 46/6
202/22 necessarily [7] 38/24 101/20 142/21 146/24 167/24 186/18 203/22 neck [2] 135/19 168/6 need [6] 32/8 34/4 166/24 170/10 170/21 194/24 needed [2] 68/17 189/7 needs [1] 167/4 negative [23] 36/9 36/15 69/3 69/6 69/15 71/13 72/4 72/10 72/18 76/9 82/1 82/7 82/18 83/3 83/9 84/21 85/6 85/13 86/13 86/17 92/24 93/16 95/14 neither [3] 149/4 190/24 192/2 never [7] 17/4 32/6 55/9 112/14 144/14 147/9 188/16 new [5] 6/13 14/25 54/15 54/16 60/22 news [5] 204/19 204/25 205/5 205/6 206/14 newspaper [2] 204/24 205/7 next [18] 4/16 29/13 35/8 36/15 37/15 39/14 40/9 45/25 48/22 51/15 74/15 105/5 105/11 105/20 116/14 119/24 122/25 195/13	Obispo [1] 6/12 object [2] 200/17 202/24 object [2] 200/17 202/24 objection [7] 98/15 105/16 105/17 124/16 140/10 200/19 207/8 observation [1] 197/12 observed [1] 183/19 obtain [2] 108/13 161/14 obtained [3] 27/19 159/18 162/3 obvious [3] 86/5 91/8 154/6 obvious [8] 14/3 52/22 55/5 67/7 108/7 108/18 161/22 175/6 occasion [1] 193/9 occasions [1] 156/22 occipital [1] 123/19 occupation [1] 5/25 occur [2] 135/25 168/19 occurred [4] 124/6 129/3 141/15 187/6 occurring [3] 127/14 162/13 178/16 occurs [3] 23/20 127/15 167/24	opening [2] 122/19 123/22 operate [1] 103/1 operated [4] 16/14 16/15 65/3 65/4 operates [1] 9/4 operating [6] 8/9 20/20 69/13 92/2 159/16 167/8 operation [1] 109/8 operations [1] 8/8 opinion [43] 21/11 21/22 21/25 27/8 42/3 54/8 61/9 97/3 98/13 101/8 124/4 124/19 125/2 125/6 125/22 126/14 128/15 134/18 135/2 137/17 137/25 138/17 139/11 142/12 142/19 143/13 145/25 146/5 146/9 146/15 147/5 147/13 148/5 148/12 148/16 149/8 151/15 151/20 152/8 152/12 157/20 166/15 183/15 opinions [7] 148/7 149/12 149/15 157/5 160/4 165/19 165/25 opportunity [3] 19/19 135/4 164/3 opposed [2] 79/12 132/1 options [2] 58/20 58/22 order [18] 25/22 33/17 42/20 46/6 100/8 100/15 111/20 113/6 115/4
202/22 necessarily [7] 38/24 101/20 142/21 146/24 167/24 186/18 203/22 neck [2] 135/19 168/6 need [6] 32/8 34/4 166/24 170/10 170/21 194/24 needed [2] 68/17 189/7 needs [1] 167/4 negative [23] 36/9 36/15 69/3 69/6 69/15 71/13 72/4 72/10 72/18 76/9 82/1 82/7 82/18 83/3 83/9 84/21 85/6 85/13 86/13 86/17 92/24 93/16 95/14 neither [3] 149/4 190/24 192/2 never [7] 17/4 32/6 55/9 112/14 144/14 147/9 188/16 new [5] 6/13 14/25 54/15 54/16 60/22 news [5] 204/19 204/25 205/5 205/6 206/14 newspaper [2] 204/24 205/7 next [18] 4/16 29/13 35/8 36/15 37/15 39/14 40/9 45/25 48/22 51/15 74/15 105/5 105/11 105/20 116/14 119/24 122/25 195/13 night [1] 34/13	Obispo [1] 6/12 object [2] 200/17 202/24 object [2] 200/17 202/24 objection [7] 98/15 105/16 105/17 124/16 140/10 200/19 207/8 observation [1] 197/12 observed [1] 183/19 obtain [2] 108/13 161/14 obtained [3] 27/19 159/18 162/3 obvious [3] 86/5 91/8 154/6 obviously [8] 14/3 52/22 55/5 67/7 108/7 108/18 161/22 175/6 occasion [1] 193/9 occasions [1] 156/22 occipital [1] 123/19 occupation [1] 5/25 occur [2] 135/25 168/19 occurred [4] 124/6 129/3 141/15 187/6 occurring [3] 127/14 162/13 178/16 occurs [3] 23/20 127/15 167/24 October [7] 194/16 195/3 197/13 201/22 201/25 202/23 203/8 October 31 [5] 194/16 195/3 197/13 201/22 202/23	opening [2] 122/19 123/22 operate [1] 103/1 operated [4] 16/14 16/15 65/3 65/4 operates [1] 9/4 operating [6] 8/9 20/20 69/13 92/2 159/16 167/8 operations [1] 109/8 operations [1] 8/8 opinion [43] 21/11 21/22 21/25 27/8 42/3 54/8 61/9 97/3 98/13 101/8 124/4 124/19 125/2 125/6 125/22 126/14 128/15 134/18 135/2 137/17 137/25 138/17 139/11 142/12 142/19 143/13 145/25 146/5 146/9 146/15 147/5 147/13 148/5 148/12 148/16 149/8 151/15 151/20 152/8 152/12 157/20 166/15 183/15 opinions [7] 148/7 149/12 149/15 157/5 160/4 165/19 165/25 opportunity [3] 19/19 135/4 164/3 opposed [2] 79/12 132/1 options [2] 58/20 58/22 order [18] 25/22 33/17 42/20 46/6 100/8 100/15 111/20 113/6 115/4 117/7 118/14 119/15 123/15 129/10 154/10 175/21 192/18
202/22 necessarily [7] 38/24 101/20 142/21 146/24 167/24 186/18 203/22 neck [2] 135/19 168/6 need [6] 32/8 34/4 166/24 170/10 170/21 194/24 needed [2] 68/17 189/7 needs [1] 167/4 negative [23] 36/9 36/15 69/3 69/6 69/15 71/13 72/4 72/10 72/18 76/9 82/1 82/7 82/18 83/3 83/9 84/21 85/6 85/13 86/13 86/17 92/24 93/16 95/14 neither [3] 149/4 190/24 192/2 never [7] 17/4 32/6 55/9 112/14 144/14 147/9 188/16 new [5] 6/13 14/25 54/15 54/16 60/22 news [5] 204/19 204/25 205/5 205/6 206/14 newspaper [2] 204/24 205/7 next [18] 4/16 29/13 35/8 36/15 37/15 39/14 40/9 45/25 48/22 51/15 74/15 105/5 105/11 105/20 116/14 119/24 122/25 195/13 night [1] 34/13 nine [1] 20/20	Obispo [1] 6/12 object [2] 200/17 202/24 object [2] 200/17 202/24 objection [7] 98/15 105/16 105/17 124/16 140/10 200/19 207/8 observation [1] 197/12 observed [1] 183/19 obtain [2] 108/13 161/14 obtained [3] 27/19 159/18 162/3 obvious [3] 86/5 91/8 154/6 obviously [8] 14/3 52/22 55/5 67/7 108/7 108/18 161/22 175/6 occasion [1] 193/9 occasions [1] 156/22 occipital [1] 123/19 occupation [1] 5/25 occur [2] 135/25 168/19 occurred [4] 124/6 129/3 141/15 187/6 occurring [3] 127/14 162/13 178/16 occurs [3] 23/20 127/15 167/24 October [7] 194/16 195/3 197/13 201/22 201/25 202/23 203/8 October 31 [5] 194/16 195/3 197/13 201/22 202/23 odor [2] 63/7 190/17	opening [2] 122/19 123/22 operate [1] 103/1 operated [4] 16/14 16/15 65/3 65/4 operates [1] 9/4 operating [6] 8/9 20/20 69/13 92/2 159/16 167/8 operation [1] 109/8 operations [1] 8/8 opinion [43] 21/11 21/22 21/25 27/8 42/3 54/8 61/9 97/3 98/13 101/8 124/4 124/19 125/2 125/6 125/22 126/14 128/15 134/18 135/2 137/17 137/25 138/17 139/11 142/12 142/19 143/13 145/25 146/5 146/9 146/15 147/5 147/13 148/5 148/12 148/16 149/8 151/15 151/20 152/8 152/12 157/20 166/15 183/15 opinions [7] 148/7 149/12 149/15 157/5 160/4 165/19 165/25 opportunity [3] 19/19 135/4 164/3 opposed [2] 79/12 132/1 options [2] 58/20 58/22 order [18] 25/22 33/17 42/20 46/6 100/8 100/15 111/20 113/6 115/4 117/7 118/14 119/15 123/15 129/10 154/10 175/21 192/18 200/19
202/22 necessarily [7] 38/24 101/20 142/21 146/24 167/24 186/18 203/22 neck [2] 135/19 168/6 need [6] 32/8 34/4 166/24 170/10 170/21 194/24 needed [2] 68/17 189/7 needs [1] 167/4 negative [23] 36/9 36/15 69/3 69/6 69/15 71/13 72/4 72/10 72/18 76/9 82/1 82/7 82/18 83/3 83/9 84/21 85/6 85/13 86/13 86/17 92/24 93/16 95/14 neither [3] 149/4 190/24 192/2 never [7] 17/4 32/6 55/9 112/14 144/14 147/9 188/16 new [5] 6/13 14/25 54/15 54/16 60/22 news [5] 204/19 204/25 205/5 205/6 206/14 newspaper [2] 204/24 205/7 next [18] 4/16 29/13 35/8 36/15 37/15 39/14 40/9 45/25 48/22 51/15 74/15 105/5 105/11 105/20 116/14 119/24 122/25 195/13 night [1] 34/13 nine [1] 20/20 nitpicking [1] 129/15	Obispo [1] 6/12 object [2] 200/17 202/24 object [2] 200/17 202/24 objection [7] 98/15 105/16 105/17 124/16 140/10 200/19 207/8 observation [1] 197/12 observed [1] 183/19 obtain [2] 108/13 161/14 obtained [3] 27/19 159/18 162/3 obvious [3] 86/5 91/8 154/6 obviously [8] 14/3 52/22 55/5 67/7 108/7 108/18 161/22 175/6 occasions [1] 193/9 occasions [1] 193/9 occupation [1] 5/25 occur [2] 135/25 168/19 occurred [4] 124/6 129/3 141/15 187/6 occurring [3] 127/14 162/13 178/16 occurs [3] 23/20 127/15 167/24 October [7] 194/16 195/3 197/13 201/22 201/25 202/23 203/8 October 31 [5] 194/16 195/3 197/13 201/22 202/23 odor [2] 63/7 190/17 off [13] 26/17 31/23 37/14 63/7	opening [2] 122/19 123/22 operate [1] 103/1 operated [4] 16/14 16/15 65/3 65/4 operates [1] 9/4 operating [6] 8/9 20/20 69/13 92/2 159/16 167/8 operation [1] 109/8 operations [1] 8/8 opinion [43] 21/11 21/22 21/25 27/8 42/3 54/8 61/9 97/3 98/13 101/8 124/4 124/19 125/2 125/6 125/22 126/14 128/15 134/18 135/2 137/17 137/25 138/17 139/11 142/12 142/19 143/13 145/25 146/5 146/9 146/15 147/5 147/13 148/5 148/12 148/16 149/8 151/15 151/20 152/8 152/12 157/20 166/15 183/15 opinions [7] 148/7 149/12 149/15 157/5 160/4 165/19 165/25 opportunity [3] 19/19 135/4 164/3 opposed [2] 79/12 132/1 options [2] 58/20 58/22 order [18] 25/22 33/17 42/20 46/6 100/8 100/15 111/20 113/6 115/4 117/7 118/14 119/15 123/15 129/10 154/10 175/21 192/18 200/19 ordered [1] 205/4
202/22 necessarily [7] 38/24 101/20 142/21 146/24 167/24 186/18 203/22 neck [2] 135/19 168/6 need [6] 32/8 34/4 166/24 170/10 170/21 194/24 needed [2] 68/17 189/7 needs [1] 167/4 negative [23] 36/9 36/15 69/3 69/6 69/15 71/13 72/4 72/10 72/18 76/9 82/1 82/7 82/18 83/3 83/9 84/21 85/6 85/13 86/13 86/17 92/24 93/16 95/14 neither [3] 149/4 190/24 192/2 never [7] 17/4 32/6 55/9 112/14 144/14 147/9 188/16 new [5] 6/13 14/25 54/15 54/16 60/22 news [5] 204/19 204/25 205/5 205/6 206/14 newspaper [2] 204/24 205/7 next [18] 4/16 29/13 35/8 36/15 37/15 39/14 40/9 45/25 48/22 51/15 74/15 105/5 105/11 105/20 116/14 119/24 122/25 195/13 night [1] 34/13 nine [1] 20/20	Obispo [1] 6/12 object [2] 200/17 202/24 object [2] 200/17 202/24 objection [7] 98/15 105/16 105/17 124/16 140/10 200/19 207/8 observation [1] 197/12 observed [1] 183/19 obtain [2] 108/13 161/14 obtained [3] 27/19 159/18 162/3 obvious [3] 86/5 91/8 154/6 obviously [8] 14/3 52/22 55/5 67/7 108/7 108/18 161/22 175/6 occasion [1] 193/9 occasions [1] 156/22 occipital [1] 123/19 occupation [1] 5/25 occur [2] 135/25 168/19 occurred [4] 124/6 129/3 141/15 187/6 occurring [3] 127/14 162/13 178/16 occurs [3] 23/20 127/15 167/24 October [7] 194/16 195/3 197/13 201/22 201/25 202/23 203/8 October 31 [5] 194/16 195/3 197/13 201/22 202/23 odor [2] 63/7 190/17	opening [2] 122/19 123/22 operate [1] 103/1 operated [4] 16/14 16/15 65/3 65/4 operates [1] 9/4 operating [6] 8/9 20/20 69/13 92/2 159/16 167/8 operation [1] 109/8 operations [1] 8/8 opinion [43] 21/11 21/22 21/25 27/8 42/3 54/8 61/9 97/3 98/13 101/8 124/4 124/19 125/2 125/6 125/22 126/14 128/15 134/18 135/2 137/17 137/25 138/17 139/11 142/12 142/19 143/13 145/25 146/5 146/9 146/15 147/5 147/13 148/5 148/12 148/16 149/8 151/15 151/20 152/8 152/12 157/20 166/15 183/15 opinions [7] 148/7 149/12 149/15 157/5 160/4 165/19 165/25 opportunity [3] 19/19 135/4 164/3 opposed [2] 79/12 132/1 options [2] 58/20 58/22 order [18] 25/22 33/17 42/20 46/6 100/8 100/15 111/20 113/6 115/4 117/7 118/14 119/15 123/15 129/10 154/10 175/21 192/18 200/19
202/22 necessarily [7] 38/24 101/20 142/21 146/24 167/24 186/18 203/22 neck [2] 135/19 168/6 need [6] 32/8 34/4 166/24 170/10 170/21 194/24 needed [2] 68/17 189/7 needs [1] 167/4 negative [23] 36/9 36/15 69/3 69/6 69/15 71/13 72/4 72/10 72/18 76/9 82/1 82/7 82/18 83/3 83/9 84/21 85/6 85/13 86/13 86/17 92/24 93/16 95/14 neither [3] 149/4 190/24 192/2 never [7] 17/4 32/6 55/9 112/14 144/14 147/9 188/16 new [5] 6/13 14/25 54/15 54/16 60/22 news [5] 204/19 204/25 205/5 205/6 206/14 newspaper [2] 204/24 205/7 next [18] 4/16 29/13 35/8 36/15 37/15 39/14 40/9 45/25 48/22 51/15 74/15 105/5 105/11 105/20 116/14 119/24 122/25 195/13 night [1] 34/13 nine [1] 20/20 nitpicking [1] 129/15 No. [2] 78/3 198/11	Obispo [1] 6/12 object [2] 200/17 202/24 object [2] 200/17 202/24 objection [7] 98/15 105/16 105/17 124/16 140/10 200/19 207/8 observation [1] 197/12 observed [1] 183/19 obtain [2] 108/13 161/14 obtained [3] 27/19 159/18 162/3 obvious [3] 86/5 91/8 154/6 obviously [8] 14/3 52/22 55/5 67/7 108/7 108/18 161/22 175/6 occasion [1] 193/9 occasions [1] 156/22 occipital [1] 123/19 occupation [1] 5/25 occur [2] 135/25 168/19 occurred [4] 124/6 129/3 141/15 187/6 occurring [3] 127/14 162/13 178/16 occurs [3] 23/20 127/15 167/24 October [7] 194/16 195/3 197/13 201/22 201/25 202/23 203/8 October 31 [5] 194/16 195/3 197/13 201/22 202/23 odor [2] 63/7 190/17 off [13] 26/17 31/23 37/14 63/7 82/9 130/13 135/20 151/2 158/12	opening [2] 122/19 123/22 operate [1] 103/1 operated [4] 16/14 16/15 65/3 65/4 operates [1] 9/4 operating [6] 8/9 20/20 69/13 92/2 159/16 167/8 operation [1] 109/8 operations [1] 8/8 opinion [43] 21/11 21/22 21/25 27/8 42/3 54/8 61/9 97/3 98/13 101/8 124/4 124/19 125/2 125/6 125/22 126/14 128/15 134/18 135/2 137/17 137/25 138/17 139/11 142/12 142/19 143/13 145/25 146/5 146/9 146/15 147/5 147/13 148/5 148/12 148/16 149/8 151/15 151/20 152/8 152/12 157/20 166/15 183/15 opinions [7] 148/7 149/12 149/15 157/5 160/4 165/19 165/25 opportunity [3] 19/19 135/4 164/3 opposed [2] 79/12 132/1 options [2] 58/20 58/22 order [18] 25/22 33/17 42/20 46/6 100/8 100/15 111/20 113/6 115/4 117/7 118/14 119/15 123/15 129/10 154/10 175/21 192/18 200/19 ordered [1] 205/4 oriented [1] 179/2

Pardon [2] 91/15 121/21 О parenthetically [1] 46/10 original... [15] 128/22 129/25 parietal [1] 123/19 part [20] 9/15 9/16 10/3 16/23 133/19 134/5 135/1 135/12 138/19 141/1 141/15 143/14 178/23 18/21 32/21 32/22 37/20 46/5 185/17 186/4 187/5 187/9 59/17 66/5 66/8 73/11 98/4 originally [4] 116/10 146/2 147/3 113/21 172/2 179/21 184/18 190/6 photo [1] 201/23 148/11 200/19 osteology [1] 107/22 **PARTIAL [1]** 1/23 other [72] 7/21 26/7 40/6 40/8 particular [29] 11/19 16/18 20/25 46/23 52/22 55/18 59/8 63/3 64/9 38/14 38/17 38/25 39/22 41/22 66/8 71/24 84/9 90/21 92/1 92/8 45/22 51/7 57/14 66/6 66/20 74/2 100/6 111/3 116/20 116/25 119/8 79/4 80/10 86/7 87/13 94/15 123/12 123/16 126/12 129/15 100/23 101/10 106/19 130/7 131/13 131/23 135/15 137/7 151/22 165/4 175/11 181/8 186/25 139/20 140/7 141/4 141/4 141/24 190/21 143/22 144/2 144/18 144/20 particularly [3] 22/9 127/24 148/8 146/23 149/1 149/10 149/15 parties [3] 4/4 194/16 195/2 parts [14] 24/14 25/6 25/11 27/11 149/15 149/23 151/22 153/10 161/10 161/12 161/14 164/2 44/7 44/8 54/18 55/12 55/12 165/17 166/12 177/20 180/14 68/13 121/6 139/25 172/14 178/3 181/3 182/6 183/5 186/5 191/18 passenger [4] 93/10 173/16 174/1 196/10 196/24 197/1 199/7 199/20 174/4 202/20 203/7 203/7 203/17 204/21 passing [1] 51/14 206/5 206/15 206/15 past [3] 56/12 56/13 112/17 otherwise [2] 12/21 133/8 path [6] 35/3 76/13 115/6 115/22 our [12] 13/25 62/9 62/17 64/6 116/6 116/11 104/21 106/15 112/9 114/4 146/7 pathologist [2] 123/15 125/15 148/2 176/4 176/19 pathway [2] 116/7 116/12 outcomes [1] 28/12 Patrick [1] 1/9 outline [2] 134/1 134/5 Patrol [1] 162/4 outside [10] 109/16 115/7 116/12 patrons [1] 205/17 116/23 145/14 154/16 183/5 pay [4] 12/4 12/8 12/12 14/5 206/10 206/13 206/24 peak [8] 39/1 47/23 47/25 48/1 48/7 52/6 52/9 52/12 over [21] 8/13 15/2 15/4 15/4 35/13 35/18 52/11 55/17 56/23 peanut [1] 67/1 64/25 66/11 76/15 118/8 120/15 peer [7] 74/8 74/25 75/6 111/1 122/5 162/18 162/20 193/1 193/11 111/14 111/24 111/24 194/23 194/24 pelvis [1] 137/6 overall [2] 144/8 148/5 penalties [1] 14/11 overseas [2] 15/5 15/6 penalty [1] 14/11 oversee [1] 109/8 people [13] 6/4 8/1 15/20 16/25 overstatement [2] 53/25 54/4 19/9 35/1 62/4 62/10 107/7 overview [2] 107/8 164/9 154/15 199/12 199/18 200/14 per [15] 24/14 24/15 25/6 25/11 own [22] 9/4 30/24 42/15 44/6 45/2 45/4 47/7 52/2 52/14 53/18 27/11 36/1 44/7 44/8 54/18 55/12 54/5 54/17 56/15 75/21 82/3 98/8 55/12 114/4 173/3 173/15 173/20 99/3 102/5 111/2 142/23 143/1 percent [8] 26/21 47/22 47/24 48/2 202/7 99/10 99/12 100/3 100/6 percentage [1] 47/23 perfectly [1] 19/3 **p.m [3]** 195/6 195/7 197/8 perform [2] 17/7 167/5 package [10] 21/4 29/17 32/23 performance [3] 16/22 56/9 60/24 68/2 68/11 69/25 72/7 80/11 83/5 performed [2] 65/14 65/18 performs [1] 16/18 packet [1] 31/16 perhaps [4] 119/6 147/23 179/4 page [39] 2/2 20/20 21/3 24/9 190/5 31/16 33/1 33/6 34/23 36/1 36/5 perimortem [2] 123/5 123/17 37/15 38/4 38/4 38/12 40/9 41/14 period [3] 56/10 158/6 158/7 45/25 46/6 46/13 46/13 48/22 periodically [1] 196/20 48/25 49/2 49/3 49/11 50/19 perpetrator [1] 128/5 50/20 51/7 51/15 52/17 52/18 person [15] 1/22 17/4 34/5 44/14 53/14 68/24 68/24 78/2 85/25 123/10 124/6 124/7 124/12 126/7 145/23 145/24 148/9 138/5 177/25 178/6 179/18 181/3 pages [12] 31/11 33/2 33/14 35/25 198/22 41/6 45/6 47/10 48/12 107/9 personal [2] 67/4 67/6 160/20 161/3 161/4 personally [2] 17/2 144/12 personnel [2] 9/22 128/1 pair [1] 180/8 paper [5] 12/25 13/4 13/16 17/5 persons [1] 206/15

67/11

paragraph [3] 78/2 78/13 79/5

Paragraph 14 [1] 78/2

parcel [1] 68/13

perspective [5] 14/7 28/8 129/2

184/15 184/16

pertains [1] 68/6

pertaining [1] 166/10

Ph.D [4] 6/19 6/22 108/11 108/13 pharmaceutical [1] 9/11 phase [2] 127/16 127/17 **philosophy** [1] 108/2 **phone [2]** 19/10 196/23 photograph [5] 94/6 162/18 201/1 201/4 202/3 photographed [1] 117/17 photographer [2] 203/1 203/3 photographers [1] 202/21 photographic [1] 157/7 photographing [2] 117/20 202/12 photographs [33] 93/20 93/22 93/24 94/15 120/22 126/20 126/24 128/17 160/13 161/12 161/14 161/16 162/2 162/11 162/16 162/21 163/8 163/11 163/22 163/24 164/12 164/15 164/18 164/19 187/11 187/21 189/12 198/14 198/16 198/23 199/2 200/24 203/7 photography [3] 117/22 128/18 129/1 photos [3] 121/23 161/25 163/15 phrase [1] 143/20 physical [3] 65/12 111/6 120/17 physically [1] 117/21 pick [5] 77/22 84/12 95/25 130/25 131/6 picture [9] 14/6 93/19 108/15 162/9 202/6 202/10 202/14 203/1 203/10 pictures [8] 197/8 197/12 199/4 200/25 201/3 201/12 201/20 202/21 pie [5] 62/21 62/22 63/1 63/2 63/6 piece [4] 13/3 133/25 134/2 184/6 pieces [5] 69/21 70/3 133/3 133/21 182/23 pig [2] 190/8 190/16 pile [4] 12/25 137/2 174/15 174/17 pipette [1] 91/7 pipetted [1] 89/12 pit [23] 143/2 148/11 149/22 154/23 161/25 162/3 162/6 162/12 162/17 178/22 180/1 180/5 180/14 180/20 181/17 181/24 182/2 182/13 182/18 185/17 186/16 187/18 191/23 place [36] 10/20 10/23 13/5 15/2 15/4 92/9 117/18 117/24 128/6 133/4 135/7 136/6 140/6 140/8 140/19 140/24 141/15 142/2 142/17 142/22 143/12 143/22 146/24 149/17 149/23 153/1 153/15 179/4 181/4 185/17 187/5 187/8 188/3 191/5 191/6 196/7 placed [3] 79/6 89/23 139/22 places [1] 205/15 PLAINTIFF [1] 1/4 plan [1] 32/6 plausible [1] 59/9 **play [1]** 176/22 please [21] 4/7 4/19 4/23 4/23 5/9 6/1 56/23 59/25 73/15 74/16 77/22 77/23 77/25 85/11 88/25 105/22 106/2 106/4 145/11 195/19 195/19 point [20] 6/22 26/9 60/3 68/4 100/9 108/7 115/15 124/16 130/10 132/17 136/15 136/15 136/19

Pevytoe [1] 162/12

P point... [7] 138/21 141/7 145/21 149/19 175/11 183/21 199/10 pointer [3] 59/21 59/22 198/21 pointing [2] 200/2 200/7 points [3] 120/25 121/3 126/12 police [9] 109/22 114/2 114/11 116/8 129/13 160/21 160/23 161/10 191/19 politely [1] 205/20 **Poly [1]** 6/12 Pontiac [1] 200/8 poor [2] 128/19 129/1 porcelain [1] 132/16 portion [1] 140/18 position [7] 109/5 119/10 119/12 119/22 120/1 135/14 152/24 positions [1] 34/11 positive [50] 38/10 41/15 42/3 42/16 42/18 42/25 43/11 44/23 45/7 45/10 45/11 45/17 45/18 45/23 46/19 46/20 47/10 48/16 49/8 55/10 68/23 69/2 69/10 69/12 69/14 70/6 70/12 71/3 71/24 81/18 81/21 82/13 82/17 83/16 86/17 87/2 87/5 87/16 87/19 88/3 88/22 88/24 89/5 89/7 89/25 91/19 92/23 93/16 95/13 possibility [1] 37/21 possible [26] 23/10 27/4 41/19 61/16 64/1 66/12 74/12 80/1 116/4 116/5 143/22 144/2 144/19 146/25 147/9 148/10 148/13 148/17 152/2 154/2 177/11 178/23 190/25 191/20 193/13 193/19 possibly [5] 86/10 116/11 137/12 137/12 154/22 post [3] 121/10 197/3 200/2 post-pubescent [1] 121/10 potential [3] 17/14 148/4 178/22 pound [5] 8/2 8/2 173/3 173/6 173/20 pounds [1] 174/1 powders [1] 171/22 **PowerPoint** [1] 58/9 **PPM [1]** 24/21 practical [3] 110/2 113/1 113/4 practice [7] 10/13 14/4 34/6 38/1 46/8 166/4 167/9 practices [4] 8/11 10/23 12/20 17/8 practicing [1] 84/10 Precisely [1] 173/25 preliminary [4] 157/13 157/21 157/25 160/9 preparation[1] 56/7 prepared [8] 36/23 41/20 43/25 45/3 80/5 88/6 98/10 208/8 preparing [1] 35/23 preponderance [1] 155/1 presence [13] 11/18 47/3 57/25 63/14 72/25 74/12 92/6 92/15 94/19 97/4 97/20 104/5 145/14 present [59] 21/17 21/21 23/7 23/19 28/23 30/15 30/18 39/2 40/6 43/5 47/16 47/21 51/23 55/1 55/2 55/4 55/5 55/7 62/15 62/16 63/2 64/10 64/15 70/15 70/16 77/6 77/8 77/9 77/11 77/13 79/22 79/24 83/9 84/5 84/23 85/15 86/18 89/8 90/4 94/25 95/3 95/15

95/16 97/9 100/4 101/6 102/17 104/25 112/9 145/7 151/8 154/3 158/9 159/22 176/8 176/14 179/16 **project [2]** 7/3 56/25 183/5 207/1 presentation [1] 58/10 presentations [1] 110/13 presented [3] 61/14 102/4 186/2 presents [1] 166/23 preservation[1] 116/13 preserve [1] 116/3 preserved [6] 28/16 29/16 30/2 30/22 54/3 73/3 presumably [2] 177/24 201/22 presume [4] 75/2 75/6 75/12 75/2 pretty [8] 7/20 62/8 99/18 166/4 168/7 174/8 185/8 200/16 prevent [1] 150/12 previous [3] 46/6 48/21 49/3 previously [2] 88/12 196/5 primary [2] 110/4 110/5 principles [4] 8/10 17/9 166/14 166/15 print [1] 34/16 prints [1] 162/22 prior [3] 115/1 162/3 189/16 pristine [3] 26/9 54/16 79/13 **private [3]** 8/24 10/5 11/8 privy [1] 149/16 Prix [3] 200/8 201/4 201/5 probability [1] 172/1 probable [3] 141/9 142/13 142/20 probably [20] 8/16 22/23 28/20 51/11 51/13 57/4 60/19 69/19 88/23 103/11 106/13 110/20 128/25 138/18 146/13 158/11 165/13 166/3 178/1 196/1 problem [26] 11/14 11/15 17/15 23/13 23/20 23/21 29/1 29/5 29/25 30/1 39/2 52/5 53/7 53/20 66/24 66/25 67/2 76/21 94/11 123/3 124/10 148/2 149/14 149/17 publications [1] 73/7 151/1 159/10 problematic [1] 121/18 problems [6] 11/13 28/22 56/24 79/8 113/10 166/24 procedure [14] 20/20 20/22 20/25 21/19 22/18 23/14 24/11 52/4 56/5 56/5 75/18 114/1 167/9 167/9 procedures [7] 75/24 77/14 81/14 111/21 129/3 168/4 168/12 proceed [4] 125/13 130/5 130/9 206/22 **proceeded** [1] 107/16 proceedings [3] 1/23 207/11 208/13 process [16] 13/8 13/13 16/23 17/1 17/22 26/3 26/25 51/2 51/3 175/6 188/6 processed [1] 167/13 processing [8] 52/25 118/15 129/5 156/13 162/3 162/12 168/4 168/8 produce [2] 8/3 10/24 production [2] 10/8 42/15 products [1] 99/2 profession [3] 112/8 123/4 125/11 professional [14] 7/12 7/15 8/23 108/16 110/22 110/25 112/3 122/15 139/11 152/19 167/4 179/7 203/1 203/3 professionally [2] 125/2 125/6 professor [1] 109/10

prohibited [1] 205/21 projectile [1] 122/22 **promise [1]** 107/8 proper [6] 42/2 42/25 120/6 130/2 158/25 159/1 properly [2] 34/20 89/19 property [12] 106/21 144/3 144/8 144/9 144/11 144/15 161/18 187/5 198/25 199/2 199/13 200/10 propose [1] 194/8 proposition [1] 170/14 proprietary [1] 15/21 prosecution [2] 112/21 165/17 prosecutor [4] 1/11 1/13 1/15 157/1 **protect [1]** 66/10 protecting [1] 67/22 protocol [47] 16/16 16/17 18/6 18/19 18/23 21/11 21/12 21/15 22/11 22/13 23/4 23/7 23/10 24/8 28/4 28/5 54/17 56/15 58/22 60/22 63/12 70/11 72/24 75/7 75/10 76/15 77/12 77/16 77/23 77/24 78/21 78/24 83/13 91/23 94/19 96/22 97/3 97/10 97/15 97/20 97/22 98/8 98/13 98/20 100/23 114/4 168/3 protocols [5] 17/20 17/24 18/5 44/6 168/16 prove [2] 123/7 123/8 provide [2] 12/16 17/13 provided [10] 24/17 57/22 73/10 156/21 156/25 162/24 163/6 163/24 164/20 185/4 provides [2] 67/19 138/7 province [2] 113/21 156/20 pubescent [2] 121/9 121/10 publication [3] 74/4 74/20 111/10 published [2] 15/18 110/11 publisher [1] 110/14 **pull [1]** 106/10 pungent [2] 189/24 190/17 purchased [2] 56/19 66/19 purely [2] 77/18 122/1 purity [2] 42/8 56/21 purple [14] 29/23 41/23 43/16 43/18 43/25 49/21 51/5 54/23 66/15 67/5 67/17 68/5 78/10 104/5 purple-topped [13] 29/23 41/23 43/16 43/18 43/25 49/21 51/5 54/23 66/15 67/5 67/17 68/5 78/10 purpose [1] 18/23 purposely [1] 120/4 58/11 127/9 128/10 131/23 135/16 purposes [4] 119/15 157/20 175/4 190/7 pursued [1] 188/12 purview [1] 184/18 put [30] 10/22 13/17 31/15 47/9 55/25 66/17 68/19 69/10 72/24 81/8 82/10 82/16 82/17 85/8 87/5 88/18 89/5 91/2 99/1 99/4 128/1 128/7 128/25 158/21 167/23 178/11 181/4 186/7 186/24 191/11 puts [1] 43/15 putting [4] 89/15 131/1 133/25 166/5 **puzzle [1]** 45/18 pyre [4] 175/20 177/18 177/21

program [1] 10/20

Р	re-burning [1] 143/9	Recross [7] 2/7 2/14 2/19 2/24
pyre [1] 178/18	reach [1] 172/9 read [14] 17/24 22/24 32/7 73/7	102/11 193/7 203/18 Recross-Examination [7] 2/7 2/14
pyres [1] 175/18	73/23 75/7 89/11 148/22 148/22	2/19 2/24 102/11 193/7 203/18
Q		red [1] 200/23
Q-46 [10] 39/6 40/17 61/9 92/20	readily [3] 24/11 78/23 79/2 reading [1] 204/19	redirect [12] 2/6 2/8 2/13 2/18 2/23 95/21 95/23 103/25 188/20
92/20 93/6 94/3 94/7 94/25	reads [1] 195/2	188/22 201/17 201/18
101/17	ready [1] 105/2	redistributed [1] 120/4
Q-47 [6] 40/9 40/17 93/9 95/7 101/17 101/17	reagent [2] 56/20 98/9 real [9] 8/5 8/6 8/18 8/20 26/8	reduce [1] 186/14
Q-48 [5] 40/17 41/10 45/12 93/14	30/2 103/23 104/12 180/24	refer [6] 17/23 38/5 107/21 109/22 127/3 130/23
101/17	real-world [1] 30/2	reference [9] 26/19 28/18 43/13
Q-49 [14] 45/8 45/13 45/14 45/15	realized [1] 13/17	46/9 56/1 66/3 73/12 79/4 149/1
49/15 49/20 54/9 55/11 57/18 61/12 87/16 88/3 89/25 104/2	really [36] 10/7 10/7 10/10 10/10 10/11 10/15 12/6 12/9 12/10	referred [2] 78/12 108/4 referring [9] 19/1 31/4 35/19
qualified [4] 38/8 122/14 125/2	18/13 19/5 23/13 23/20 24/1 26/6	50/11 60/4 79/7 79/9 94/14 159/3
125/6		refers [2] 37/8 60/17
qualitative [4] 77/2 77/4 77/5 77/18		reflect [1] 25/15 refute [1] 149/11
qualitatively [2] 77/7 80/17		regain [1] 132/21
quality [18] 6/2 6/14 6/15 8/4 8/10	186/23	regard [1] 23/22
8/14 10/19 10/23 10/25 11/2 15/10 15/19 15/24 36/14 38/1	rear [2] 93/10 95/6 reason [13] 57/9 57/11 79/20	regarding [4] 161/7 162/11 178/22
42/18 66/5 67/10		183/16 regardless [1] 192/10
quantify [1] 184/20	159/11 173/22 190/19 191/10	Regional [2] 114/5 114/7
quantitate [3] 27/13 100/10 100/12	- / -	regular [1] 32/15
quantitated [1] 54/25 quantitates [1] 54/12	reasonable [10] 97/8 124/11 134/19 137/24 151/15 151/20	relate [3] 48/10 50/5 105/15 related [1] 80/9
quantitative [5] 77/3 77/10 80/13		relates [1] 52/7
80/15 100/16	reasons [5] 139/2 146/7 168/3	relation [1] 47/25
quantity [6] 42/19 43/4 43/24 48/4 48/10 98/10	168/11 204/22 recall [29] 52/6 58/13 86/20 86/22	relative [4] 47/4 119/22 135/13 153/18
quarry [3] 137/2 137/2 139/9		reliability [1] 10/18
quart [1] 66/14	142/11 144/10 154/23 154/24	reliable [5] 6/6 6/6 7/23 8/21 13/7
quarter [3] 179/13 179/13 179/13 question [29] 11/23 12/7 13/9	161/4 162/7 162/18 162/21 162/23 163/13 163/15 163/17 163/21	reliably [1] 10/24 remain [3] 105/22 128/6 137/11
19/14 29/11 32/1 40/11 45/14	163/23 164/21 165/3 187/19 189/5	
45/19 53/24 65/11 71/20 72/7	192/12 192/23	remains [63] 106/22 109/21 110/6
72/8 77/4 79/15 82/8 96/2 98/16 104/12 111/19 121/5 129/22	receive [4] 60/14 111/18 162/11 195/11	113/3 113/7 113/9 113/11 114/18 115/18 115/21 117/2 117/12 120/3
140/14 159/10 183/16 199/9	received [13] 21/4 21/6 107/23	121/7 123/14 125/20 130/19
203/17 206/21	128/17 129/12 157/7 157/8 157/11	134/12 134/13 134/20 135/5
questioned [1] 61/10 questioning [2] 97/1 176/1	157/13 161/17 162/10 198/10	135/14 136/13 138/4 139/6 139/23
questioning [2] 97/1 170/1 questions [7] 90/8 97/24 102/10	199/22 recess [4] 64/14 105/9 151/5	143/15
124/17 158/25 188/25 193/6	176/13	155/6 168/25 169/1 169/2 169/4
quick [2] 103/23 163/12	recipe [6] 16/19 18/8 18/9 18/12	169/22 171/5 172/2 172/9 175/12
quicker [1] 172/8 quickly [3] 131/16 131/20 178/17	20/22 23/6 recognize [8] 20/8 87/9 88/16	176/20 178/7 178/12 178/16 179/11 179/15 179/25 179/25
quite [13] 26/22 44/16 59/9 61/13	124/12 154/1 154/11 179/21	180/20 182/17 182/19 183/19
61/16 72/19 72/21 131/3 132/16	199/24	188/3 190/9 190/16 190/17 192/25
133/23 159/2 160/17 190/17 quoting [2] 128/12 148/8	recognized [2] 74/4 159/1 recollection [3] 93/3 162/15	193/10 remark [1] 50/6
R	199/15	remedy [1] 150/12
	reconstruct [3] 12/23 12/25 32/4	remember [8] 37/13 69/2 72/6
rack [1] 34/8 radio [2] 204/25 205/6	reconstructing [1] 67/10 record [17] 4/5 5/10 7/8 37/12	72/12 72/15 85/3 85/7 196/6 remembered [1] 196/12
raise [3] 4/19 105/23 170/16	41/18 59/16 106/5 117/13 145/12	remind [4] 64/7 104/22 145/4
raised [2] 145/13 145/14	145/14 151/3 158/12 158/17	176/5
ran [8] 25/1 25/1 25/3 30/1 33/24 34/20 50/11 51/3	158/18 158/22 195/20 207/6 recorded [1] 58/6	remnants [3] 154/16 191/20 191/20
range [3] 44/9 121/13 154/20	records [2] 51/25 134/24	remove [1] 205/8
ranging [1] 44/7 rate [1] 177/22	recover [5] 26/15 113/7 115/16	removed [2] 26/12 130/6
rather [2] 7/4 59/4	135/4 141/18 recovered [13] 139/25 180/1 180/4	removing [1]
ratio [6] 46/23 52/5 52/14 53/9	180/13 181/17 182/13 182/17	rendered [2] 124/20 148/17
92/8 177/9	182/24 183/25 184/7 187/14	reorient [1] 132/15
ratios [1] 47/4 RAV [1] 61/20	187/17 191/17 recoveries [2] 130/4 168/15	report [42] 13/4 14/13 15/22 19/19 20/12 20/16 21/10 21/12 21/13
RAV4 [9] 40/16 59/10 63/15 64/1	recovery [9] 76/12 109/21 115/12	24/9 28/11 29/13 29/14 37/10
93/7 93/10 93/15 101/24 101/25 re [1] 143/9	120/7 128/10 130/2 130/3 134/17	50/6 50/11 50/14 53/16 81/18
	138/14	82/5 96/21 104/17 106/23 120/19

R
report [18] 121/5 121/14 123/4
137/19 138/7 146/8 147/25 148/2 149/12 149/17 157/21 164/4 165/5
165/10 166/1 166/5 206/5 206/16 reported [13] 1/24 7/24 11/20
11/24 13/3 21/11 21/12 29/21
47/8 47/13 47/15 81/17 208/6 reportedly [2] 23/5 40/16
reporter [6] 1/25 81/3 86/24 150/6
208/5 208/19 reporting [4] 13/18 13/23 44/5
101/4
reports [20] 32/9 34/18 106/19 112/11 112/11 157/8 160/6 160/21
112/11 112/11 157/8 160/6 160/21 160/23 160/24 161/6 161/7 161/10
164/2 164/13 164/17 189/13 204/24 204/25 205/25
represent [1] 114/6
representative [1] 121/7 representing [1] 152/24
represents [3] 25/12 33/21 41/21
reproduce [2] 18/14 18/18 requested [1] 106/18
require [1] 62/16 required [3] 119/14 165/14 179/8
requirements [1] 56/6
research [7] 110/1 110/3 110/4 113/2 113/9 121/4 190/6
residence [1] 199/5
residences [1] 198/19 residue [1] 189/19
resolved [1] 166/25
respect [4] 106/22 152/17 156/4 164/12
respond [1] 159/3
responsible [3] 38/6 38/8 114/24 rest [7] 83/19 99/13 99/23 99/23
128/8 145/20 159/19 restrictions [1] 206/10
result [11] 14/9 23/15 30/13 49/4
53/22 55/10 96/15 96/19 127/13 132/5 142/21
results [43] 8/1 8/7 8/17 8/18 8/20
9/25 10/19 13/7 13/15 13/17 13/23 14/2 14/3 15/20 15/22 19/7
19/17 21/23 21/24 22/6 23/16
28/8 28/22 29/21 30/24 33/22 34/21 51/10 52/22 56/2 58/18
58/18 59/6 61/5 61/13 68/22
82/11 83/3 84/9 84/12 90/24 96/5 96/11
resume [5] 64/6 104/24 151/10
159/24 176/15 resumé [4] 7/9 64/25 110/20 156/7
retake [1] 57/16
return [1] 64/12 review [20] 8/24 19/19 21/4 32/14
34/19 37/7 41/16 75/6 83/7
106/19 111/1 111/24 111/25 112/1 120/19 123/18 138/4 145/21 166/4
187/20
reviewed [9] 20/16 22/10 27/6 29/16 58/4 60/20 74/9 74/25
143/17 reviewing [5] 24/19 72/15 101/6
111/14 164/23
rid [2] 37/20 37/22 right [179] 4/19 5/5 5/15 5/20
7/14 9/16 16/4 19/18 20/6 20/18
21/9 22/9 23/8 24/22 29/13 33/10

33/19 34/23 35/3 35/18 35/18

35/21 36/15 37/7 37/13 37/25 39/12 40/25 41/11 41/12 42/22 46/14 46/16 46/24 48/16 48/22 49/6 49/13 50/10 52/8 53/9 53/13 53/16 54/7 54/10 54/19 56/17 56/23 57/6 58/4 60/7 60/14 63/11 64/5 64/11 64/13 68/8 76/19 83/12 85/20 90/9 90/12 91/6 95/25 96/7 97/15 98/4 100/24 102/6 104/3 104/10 104/14 104/20 105/23 108/6 110/19 111/12 113/20 133/1 133/22 144/16 150/4 151/2 151/6 156/3 156/15 156/20 157/3 157/10 157/18 158/19 159/13 160/20 161/3 161/12 162/2 162/24 163/10 163/22 164/6 164/18 164/22 165/2 165/9 166/1 166/10 166/12 168/2 168/21 169/6 169/11 169/21 169/24 170/3 170/4 170/10 170/20 170/24 171/2 171/4 171/11 171/20 172/17 173/2 173/6 173/8 173/11 173/21 174/2 174/4 174/20 175/3 176/3 177/2 177/19 178/5 178/11 178/15 178/20 180/7 180/13 180/17 180/24 181/19 181/20 182/9 182/14 183/14 184/13 185/8 185/13 185/15 185/24 186/10 186/23 187/11 187/14 187/20 187/23 188/3 188/5 188/13 188/15 193/12 193/23 194/14 195/1 196/10 197/6 197/19 198/20 199/9 200/23 201/7 201/15 202/4 202/17 204/3 204/11 rigorous [1] 10/19 Rindt [1] 162/13 risk [2] 99/4 130/17 rivets [2] 180/8 181/9 road [7] 16/1 198/17 199/11 199/14 199/16 202/22 203/11 roadway [1] 199/17 robotically [2] 34/4 34/12 role [2] 114/21 120/9 roll [1] 163/7 rolls [1] 162/22 **Rom [1]** 160/12 room [1] 63/3 rough [1] 121/12 roughly [1] 173/7 routine [1] 166/4 routinely [2] 57/21 156/11 RPR [2] 1/24 208/19 rubber [4] 189/17 189/19 190/18 193/11 rule [14] 63/14 104/17 143/18 144/6 146/24 147/8 147/16 147/21 scene [27] 109/24 114/3 114/5 150/2 150/10 150/20 152/1 152/16 190/24 rules [6] 16/1 41/9 42/6 52/3 52/14 61/1 run [19] 13/22 26/21 28/6 32/3 32/5 33/15 33/23 33/25 34/3 34/8 35/23 42/24 45/11 80/24 81/4 84/13 95/1 95/4 109/4 running [3] 31/24 33/22 61/4 runs [2] 23/11 83/13 S said [13] 12/5 51/13 90/16 90/21 94/17 101/3 115/23 116/23 135/23

189/8 198/22 202/16 208/13 sale [2] 200/9 201/6 **salt [1]** 70/15 salvage [3] 198/25 199/17 200/10 same [27] 18/16 46/1 46/1 46/2 46/2 46/3 46/11 46/13 49/4 52/22 52/24 52/25 53/1 53/6 53/7 53/7 67/7 75/5 79/14 81/23 82/5 101/6 101/12 128/7 130/16 177/20 201/11 sample [103] 13/1 13/6 13/22 22/7 23/19 24/21 25/5 25/13 25/17 26/1 26/8 26/11 26/17 28/14 29/8 30/8 30/9 30/25 34/12 35/20 36/1 36/14 37/1 37/4 37/19 38/8 38/17 41/20 41/22 41/23 41/25 42/13 42/14 43/22 45/1 45/3 45/15 45/16 45/19 45/20 45/20 46/2 46/20 47/16 48/21 49/19 49/24 49/25 50/3 50/12 50/21 50/23 51/1 51/4 51/12 52/9 53/11 53/12 54/16 55/3 55/7 59/13 61/6 61/11 61/16 63/22 63/23 66/6 66/10 67/12 67/23 70/13 78/20 79/25 80/6 80/8 81/11 81/12 81/17 81/19 84/13 86/18 86/21 86/23 86/25 87/1 87/3 87/13 87/14 87/21 87/23 88/7 88/9 88/10 89/20 89/21 90/25 91/16 91/17 95/2 95/4 95/17 99/9 sampler [1] 34/10 samples [46] 9/10 9/10 9/11 9/12 10/13 11/21 13/23 14/2 16/20 22/4 22/5 28/19 28/24 29/10 29/11 31/25 32/1 32/2 32/2 32/5 33/15 33/22 34/8 34/9 36/21 37/3 40/12 42/6 42/7 42/7 59/1 59/2 60/11 60/25 61/4 61/24 61/25 66/17 66/21 67/9 76/13 79/9 87/20 95/2 96/15 101/18 San [1] 6/12 sanction [1] 150/21 **Saturday [1]** 196/12 saved [1] 12/13 saw [17] 12/1 48/8 48/20 50/15 81/9 83/17 86/13 121/23 126/24 127/1 129/6 192/10 197/7 198/15 198/22 201/12 202/11 saying [21] 79/3 80/1 82/15 87/12 99/25 104/16 116/9 125/10 132/20 140/4 142/16 147/14 147/16 147/21 147/22 149/4 149/21 149/25 150/14 150/18 160/5 says [13] 29/22 31/20 35/9 41/15 49/15 53/16 58/17 60/7 77/8 88/22 89/11 104/2 147/2 scale [1] 47/19 scenario [1] 190/10 114/16 114/17 115/2 115/3 115/8 115/10 115/21 116/6 116/10 116/25 118/8 118/10 118/11 118/15 118/18 118/22 133/13 144/7 154/3 161/14 161/16 164/5 166/23 168/4 scenes [7] 109/22 113/8 113/14 113/25 156/12 166/20 168/8 **Scheduling [1]** 204/5 scholarly [2] 74/6 74/19 school [1] 7/4 science [12] 6/11 10/6 10/7 10/13 10/17 76/17 107/1 107/13 109/13 111/20 112/7 120/17 Sciences [2] 109/7 111/6 scientific [16] 8/10 18/25 21/13 23/2 63/12 74/4 74/20 77/19

111/22 134/19 137/24 151/16

shortest [1] 22/23 slim [1] 179/22 S shorthand [1] 208/10 sliver [1] 179/14 scientific... [4] 151/21 152/1 152/5 shortly [2] 123/8 123/9 slow [1] 81/3 slower [1] 177/21 small [12] 25/20 90/14 91/6 91/8 shot [1] 122/13 scientifically [2] 77/14 80/2 should [7] 117/14 149/8 205/25 scientist [2] 108/19 111/1 206/2 206/4 206/5 206/12 91/9 140/25 141/19 141/25 179/12 scientists [1] 18/17 shoulder [4] 114/10 114/10 115/9 179/21 182/13 192/19 scope [6] 19/6 22/13 22/14 22/16 smaller [6] 26/1 133/21 141/10 115/9 22/24 148/19 shouldn't [1] 56/14 141/12 191/8 192/22 SCOTT [5] 2/10 105/21 105/24 shovels [1] 129/9 smear [1] 175/19 106/6 145/22 smell [11] 62/10 62/19 62/22 show [12] 20/6 20/18 31/5 51/17 screen [7] 22/21 50/10 57/12 71/23 72/5 82/11 88/18 189/20 189/24 190/15 190/18 84/5 93/19 94/2 94/6 107/5 186/2 199/21 199/23 193/9 193/11 193/18 193/22 screening [2] 22/19 83/14 showed [4] 57/10 71/22 89/7 smells [2] 62/11 63/3 scribbled [1] 38/15 smelter [8] 144/10 148/15 148/25 182/6 seat [1] 57/16 149/22 187/8 187/21 187/23 188/2 showing [10] 12/15 39/19 39/20 seated [11] 4/23 105/1 105/2 41/7 47/8 49/6 86/5 162/16 163/5 So when [1] 132/3 106/2 145/11 151/9 158/10 159/23 198/10 Society [1] 6/15 176/9 195/19 207/2 shown [5] 10/6 10/16 72/4 96/3 sodium [1] 70/15 second [11] 39/18 44/23 45/11 196/16 soft [1] 123/14 47/6 49/3 49/11 51/17 137/1 shows [9] 50/15 54/5 58/19 78/22 soil [2] 130/6 130/6 141/7 194/20 195/7 82/13 96/5 96/22 200/1 205/12 sole [1] 87/15 Secondly [1] 119/17 solely [1] 86/15 shred [1] 173/18 seconds [2] 48/14 49/13 shrinkage [1] 127/14 solid [2] 37/4 172/23 sic [1] 181/24 section [4] 22/13 88/20 111/7 solids [2] 171/13 171/14 120/18 side [14] 85/24 85/25 112/18 solution [5] 56/16 78/17 98/10 security [1] 196/17 135/20 145/2 145/13 158/3 158/20 98/14 98/20 seeing [7] 66/9 86/20 86/22 87/1 158/24 159/11 159/12 165/17 solutions [1] 56/7 101/7 137/5 163/18 204/5 204/9 somebody [8] 18/18 29/8 111/15 seem [5] 17/9 28/11 28/13 28/15 Sielehr [1] 162/13 121/10 142/25 161/23 196/19 46/21 **signatures** [1] 122/20 202/2 seemed [1] 154/24 significance [3] 152/20 153/4 somehow [1] 171/23 seems [3] 34/19 96/12 172/24 153/9 someone [3] 99/25 202/7 205/7 seen [11] 44/16 51/12 93/20 93/22 something [31] 5/18 17/21 24/5 significant [6] 43/21 76/14 76/19 163/22 164/13 185/11 189/11 150/14 154/20 175/1 34/16 38/15 39/3 39/24 40/23 189/14 198/14 199/2 signing [1] 38/11 41/4 45/7 46/17 61/2 62/21 62/23 sell [3] 43/3 43/6 200/13 77/6 77/11 90/20 99/18 117/16 similar [2] 7/20 98/25 sense [9] 110/21 110/22 135/21 Similarly [1] 98/25 118/19 123/5 125/25 126/1 127/25 simply [16] 16/17 23/23 37/10 46/11 48/7 55/2 59/5 59/11 61/18 67/10 77/6 78/13 86/8 101/9 147/5 178/9 183/22 184/11 200/12 131/5 133/24 136/9 147/23 158/22 200/15 192/18 192/24 sometimes [15] 11/10 30/13 30/14 sensitive [2] 82/2 82/5 30/18 30/19 36/4 90/17 91/25 sensitivities [1] 62/11 144/21 194/9 sent [1] 94/7 96/17 96/17 114/1 119/5 136/21 **simulation** [1] 164/5 sentence [4] 29/13 50/5 145/24 since [6] 15/14 15/17 38/18 108/16 153/23 167/9 147/2 108/20 158/20 somewhat [2] 150/19 153/5 separate [2] 68/3 79/5 single [3] 81/18 119/12 121/7 somewhere [1] 169/22 separated [1] 69/20 sir [9] 6/11 19/11 67/15 68/16 soon [1] 110/17 sequence [4] 32/3 32/4 33/17 69/4 sequester [1] 204/17 69/6 73/16 90/5 110/3 196/4 sorry [21] 5/17 7/5 14/20 24/9 site [22] 17/1 17/6 17/25 115/20 32/17 33/3 48/25 51/20 73/18 73/25 74/22 81/4 85/2 85/17 series [1] 163/8 128/22 129/25 135/3 136/14 137/2 serious [2] 11/11 103/2 138/19 139/9 139/13 141/9 142/13 85/22 89/10 90/7 101/1 101/2 142/20 143/14 147/9 152/2 153/24 serve [2] 175/15 206/4 121/21 155/11 services [2] 9/6 129/13 190/21 190/22 190/25 sort [19] 14/12 25/12 25/21 32/4 set [19] 17/16 31/23 33/13 34/8 sites [5] 137/23 144/2 144/19 34/3 35/2 38/15 42/17 62/6 62/6 34/10 35/23 47/23 48/1 48/9 61/1 79/13 99/15 118/7 127/9 132/8 146/25 167/18 69/24 79/11 81/23 83/25 95/5 situ [3] 128/20 128/22 141/1 132/18 133/2 189/17 189/20 168/12 198/19 200/3 202/19 situation [3] 11/6 159/2 168/18 sorts [4] 27/23 119/18 131/19 sets [2] 16/19 47/21 situations [1] 140/20 136/3 setting [1] 176/21 six [6] 25/6 56/11 56/12 56/15 sound [2] 30/5 77/14 seven [1] 194/21 98/9 98/22 sounds [4] 103/6 169/24 173/8 several [3] 75/12 108/19 176/22 Sixteen [3] 156/17 156/18 156/19 179/23 shall [7] 129/10 130/14 130/18 sizable [1] 160/17 source [4] 50/13 174/8 205/23 131/3 141/1 157/8 182/3 size [6] 21/9 134/2 141/22 153/18 206/1 **shape [1]** 155/12 153/18 179/25 speaking [1] 197/21 share [2] 18/12 120/25 sizes [1] 190/8 spec [3] 75/22 75/22 75/23 shared [1] 159/5 skeletal [2] 108/11 123/13 **Special [4]** 1/11 1/13 1/15 162/12 shelf [7] 55/25 56/4 56/8 98/23 skeleton [9] 107/21 107/24 109/14 speciality [1] 107/20 98/24 99/1 99/3 109/15 119/9 121/15 131/15 specialize [1] 168/24 shoes [1] 181/11 139/25 154/13 specialty [1] 166/13 specific [11] 33/11 43/7 44/5 shoot [1] 185/7 skew [1] 90/20 **shop [2]** 198/16 201/21 skin [2] 131/18 175/14 107/20 111/17 122/18 123/18 short [4] 4/9 22/16 145/4 158/7 135/6 135/15 147/2 154/1 **sleeping** [1] 34/14 **shorter [1]** 158/6 slightly [2] 96/18 150/11 specifically [15] 15/11 17/20 25/23

S specifically... [12] 50/7 72/1 106/21 108/24 119/3 120/9 122/8 127/10 153/22 154/14 162/23 169/16 specifications [1] 66/22 specs [2] 32/11 103/8 spectra [1] 32/12 spectral [1] 52/4 spectrographs [1] 32/10 spectrometer [2] 70/1 70/4 spectrometers [1] 65/4 spectrometry [1] 16/9 spectromety [1] 16/9 spectrum [1] 46/5 speculating [1] 86/10 speculation [1] 122/1 speculative [1] 200/17 spell [3] 5/9 106/5 195/20 spend [2] 83/18 158/12 spike [1] 99/20 spoke [4] 192/5 194/17 195/3 198/11 spot [9] 29/9 30/2 46/17 48/12 49/15 49/17 54/6 79/8 87/1 square [2] 130/7 130/10 squares [2] 118/9 118/11 ss [1] 208/1 stability [4] 67/14 68/6 98/6 98/14 stable [2] 56/3 56/10 Stachowski [2] 194/17 195/4 stack [3] 24/16 27/22 163/10 staffed [1] 9/21 stage [8] 127/23 132/9 132/10 132/11 132/13 132/20 154/25 182/2 stages [3] 131/10 131/22 206/22 stain [15] 21/14 21/17 21/20 21/20 21/21 25/16 25/17 26/3 26/15 50/25 59/1 59/2 78/20 95/9 96/6 stains [7] 21/23 22/1 40/16 61/10 64/2 101/25 104/13 stamp [1] 35/16 standard [7] 15/24 20/20 34/6 42/18 43/2 167/8 168/3 standards [2] 43/4 111/23 **standing [1]** 105/22 staple [1] 35/2 stapled [2] 31/16 33/13 start [8] 31/15 48/14 100/10 106/14 116/23 130/11 176/11 194/24 **started [2]** 7/2 33/24 starting [1] 24/21 state [34] 1/1 1/3 1/12 1/14 1/16 4/2 4/5 4/7 4/11 4/24 5/9 9/7 30/20 64/17 74/16 78/22 79/1 80/4 83/2 87/18 106/4 112/21 113/12 146/10 147/24 162/4 163/17 168/1 172/9 194/10 195/8 195/19 208/1 208/5 State's [1] 148/7 stated [3] 94/21 94/22 94/24 statement [8] 29/18 29/19 29/22 30/23 50/13 79/4 79/20 84/25 states [4] 22/18 68/4 84/15 145/23 static [1] 76/17 stating [7] 67/13 68/14 88/3 94/18 102/16 103/4 196/18 Station [2] 118/19 118/24 **stature [2]** 126/16 186/8 status [1] 205/18 steer [1] 150/25

step [5] 26/24 56/23 122/25 124/23 145/9 stepping [1] 134/1 **steps** [1] 205/23 **STEVEN [21]** 1/6 1/21 4/2 81/16 82/12 83/11 84/6 84/16 84/23 86/14 86/19 88/4 89/8 90/1 91/3 91/13 95/12 136/21 148/12 194/16 173/23 178/12 195/3 stick [1] 73/21 still [15] 25/2 25/5 29/9 49/6 59/17 92/14 92/15 103/12 104/10 113/13 115/15 136/5 137/12 139/8 surveyors [2] 118/20 118/20 199/6 stipulation [4] 194/9 195/2 195/9 195/12 stood [1] 197/25 stop [4] 19/13 111/12 121/20 140/2 stopped [1] 150/8 storing [1] 35/7 STRANG [18] 1/17 2/11 2/13 2/16 2/18 2/21 2/23 4/13 105/10 146/11 151/10 158/10 188/20 194/4 194/7 194/20 195/12 204/6 Strang's [1] 56/25 **streaming** [1] 58/7 strength [1] 132/23 stricken [1] 200/20 strictly [2] 184/18 187/21 strong [4] 125/19 132/17 189/24 190/1 struck [1] 154/19 **structure** [1] 132/15 structures [1] 141/11 stuck [1] 123/16 student [1] 109/16 students [2] 109/11 130/24 studies [4] 91/25 96/14 121/25 130/24 study [6] 27/14 79/5 94/21 95/1 110/5 121/4 studying [1] 168/24 stuff [4] 62/4 83/8 149/15 186/9 Sturtivant [1] 161/1 subject [4] 55/20 70/2 75/5 193/15 subjected [4] 110/7 126/25 179/6 193/10 submitted [1] 49/22 subsequently [2] 44/18 117/18 substance [2] 48/6 100/4 substantially [3] 75/18 75/24 100/17 **subtle [1]** 103/6 such [23] 18/4 21/18 28/2 74/8 88/16 112/11 113/11 118/10 119/23 123/3 123/5 124/20 131/18 131/23 132/2 144/5 146/9 167/3 171/8 175/7 190/9 206/14 206/16 Sudbury [3] 107/2 108/25 113/19 suddenly [2] 102/19 102/20 sufficient [1] 97/4 sugar [7] 8/2 80/22 80/23 81/6 81/8 81/10 81/11 suggest [3] 147/22 150/15 158/24 suggested [1] 145/13 suggesting [1] 203/2 **summarize** [1] 7/10 summarizing [1] 160/6 summary [1] 146/13 Sunday [1] 162/4 superimpose [1] 118/7

stenographic [1] 208/9

Supervising [1] 114/6 supply [1] 43/3 support [10] 53/18 94/22 121/25 139/3 139/11 141/8 141/13 142/12 142/19 185/23 supported [2] 59/6 96/24 suppose [1] 168/20 surface [5] 26/12 26/13 172/7 surprise [1] 185/9 **surprising** [1] 104/8 surrounding [4] 106/20 119/20 129/19 157/15 survived [3] 123/10 141/24 141/25 suspect [4] 62/24 114/3 117/1 165/13 **suspected** [5] 22/20 114/16 137/5 137/8 156/12 sustain [1] 200/18 Sustained [1] 98/17 swab [11] 26/14 26/17 36/23 40/13 40/13 40/15 89/12 89/16 89/23 94/3 94/7 swabbed [2] 26/13 59/10 swabbing [2] 25/16 26/4 swabs [5] 37/11 61/17 61/20 93/19 93/20 swear [1] 5/6 switch [1] 130/13 sworn [3] 4/21 105/25 195/17 sync [1] 29/10 syringe [1] 78/17 system [6] 17/12 76/23 79/17 103/7 112/6 118/1 systematic [1] 129/4

table [1] 178/11 take [31] 31/4 64/6 78/17 104/21 107/15 122/3 122/25 130/25 131/25 138/1 145/4 154/18 156/1 156/6 156/11 156/20 158/2 162/25 163/11 165/7 169/25 175/24 176/4 182/21 186/13 186/13 186/16 196/7 202/3 203/1 205/23 taken [15] 37/13 40/16 64/14 94/4 105/9 141/5 145/2 160/13 161/22 163/25 164/19 176/13 176/24 181/3 208/9 takes [6] 16/21 33/25 61/2 154/10 167/5 169/12 taking [26] 26/3 26/8 37/1 50/22 51/1 51/2 89/13 89/15 118/10 128/5 133/24 148/21 166/12 197/8 197/12 198/14 198/16 198/23 199/3 201/12 201/20 202/6 202/10 202/14 202/21 203/6 talk [11] 7/14 22/10 33/14 41/13 58/15 103/10 111/14 166/18 168/21 178/24 200/22 talked [3] 58/10 66/2 101/21 talking [18] 32/19 33/2 60/5 62/1 69/8 72/20 79/14 90/12 91/4 92/21 115/13 134/10 136/14 136/18 143/4 169/2 192/19 197/10 talks [1] 29/14 tall [2] 48/1 48/1 tandem [1] 75/22 targeting [1] 72/1 tarp [3] 162/17 162/18 162/20 task [1] 116/14 tasks [1] 114/20

themselves [**3**] 93/23 98/19 132/15 | 189/7 193/25 194/3 196/13 198/1 Т tax [1] 11/11 teacher [1] 109/9 teaching [3] 108/22 109/17 130/24 technical [2] 62/4 121/20 technically [1] 10/22 technicians [1] 109/24 technique [5] 65/16 79/2 84/10 101/13 120/7 techniques [5] 75/19 80/25 83/16 138/14 141/2 technology [1] 65/2 teeth [1] 141/19 telephone [2] 194/18 195/5 television [2] 205/1 205/5 telling [1] 160/2 tells [6] 39/22 42/11 45/14 77/10 133/19 197/7 temperature [7] 55/22 169/18 169/19 169/21 170/16 172/15 175/1 tend [3] 123/4 130/23 140/5 tends [1] 139/22 Teresa [5] 93/15 95/10 200/25 201/20 203/8 term [4] 14/1 24/14 123/17 177/17 terms [8] 15/15 23/2 62/18 89/22 157/19 171/25 172/6 181/6 terribly [1] 104/8 Tesheneck [3] 1/24 208/4 208/19 test [17] 9/10 22/5 22/8 27/9 28/1 34/20 59/14 60/11 61/25 63/25 65/19 74/12 83/3 96/6 97/4 101/16 190/7 tested [7] 21/14 29/22 42/8 57/24 61/21 63/15 66/21 testified [9] 4/22 15/6 106/1 112/13 112/19 137/4 165/9 195/18 196/3 testify [1] 148/10 testimony [19] 16/5 58/6 64/8 78/4 112/11 128/9 128/13 140/12 142/11 146/4 148/20 150/13 156/21 156/25 157/11 157/24 178/21 182/16 189/13 testing [10] 10/12 14/2 28/23 58/1 60/25 77/17 81/13 82/2 94/8 95/14 tests [8] 16/12 21/23 23/12 27/22 46/22 60/17 63/16 102/5 thank [35] 5/8 5/16 5/22 20/3 60/2 64/4 68/17 76/19 83/1 83/23 85/1 95/18 95/19 102/7 103/20 103/22 104/19 105/12 106/3 145/10 145/18 150/23 151/11 155/13 155/15 155/22 159/25 163/4 176/16 188/19 188/21 193/3 198/5 198/7 201/16 thanks [3] 188/18 194/5 203/16 the 16th [1] 33/16 the ion [1] 41/8 their [52] 4/5 8/21 13/19 13/21 15/24 18/1 18/3 20/21 20/22 24/1 25/10 42/9 44/21 51/3 52/4 52/14 55/8 56/1 56/2 56/5 56/5 56/9 56/15 57/22 61/5 61/14 63/16 66/22 73/11 75/18 75/21 76/22 76/23 76/23 77/22 78/5 78/21 83/13 83/14 87/17 87/18 91/23 98/12 98/20 111/10 116/21 119/10 119/22 135/12 139/20 199/18 200/4

theoretical [2] 25/13 79/13 there's [49] 20/4 22/6 22/13 23/1 26/25 28/2 28/5 31/11 33/13 35/1 37/12 37/18 38/4 39/12 39/19 39/20 40/6 40/6 40/22 42/6 42/10 44/10 44/23 47/15 49/6 53/13 61/1 66/24 72/6 79/23 83/8 84/8 86/8 88/7 88/8 118/6 124/18 127/4 131/18 137/1 143/2 144/10 147/22 150/14 183/23 183/24 193/23 196/19 198/19 Thereabouts [1] 174/3 thereafter [1] 208/11 therefore [2] 96/21 139/12 Thermal [1] 170/11 these [55] 9/9 10/12 17/22 28/2 32/9 32/10 32/13 33/25 34/3 34/7 34/18 34/24 35/5 35/24 35/25 43/25 46/3 46/22 51/10 57/21 59/1 60/11 66/18 75/14 75/19 83/2 87/20 94/15 103/8 123/15 127/5 131/19 134/20 135/22 136/20 141/22 141/25 142/6 144/13 144/14 146/1 146/20 147/3 tilted [1] 112/4 153/14 153/20 153/20 160/4 163/13 163/21 167/6 184/17 190/7 201/9 204/15 204/22 they're [1] 50/1 thing [9] 14/12 18/16 66/18 79/14 92/2 141/12 142/10 181/21 188/15 things [46] 5/4 11/11 12/22 12/23 16/24 17/3 25/19 25/22 27/23 28/6 32/13 40/6 40/8 41/7 43/9 53/4 55/21 62/10 62/14 66/18 67/25 68/21 75/13 88/1 90/18 91/1 101/14 103/9 117/20 119/19 120/6 129/18 129/20 135/22 153/12 153/20 154/17 171/5 173/11 175/7 176/24 186/10 196/10 196/12 197/1 204/15 think [37] 32/20 44/20 57/2 57/5 58/16 63/13 79/14 87/12 90/16 94/9 110/19 115/22 117/25 122/24 tires [7] 174/8 174/15 186/24 124/18 124/22 131/17 138/2 142/10 146/14 149/8 150/19 158/11 159/7 161/11 176/1 179/4 191/11 194/21 194/25 196/1 199/14 199/14 199/15 199/20 202/25 206/19 thinking [1] 105/14 third [2] 88/23 142/10 **THOMAS [1]** 1/13 thorax [1] 135/19 those [74] 8/6 8/19 16/11 16/14 23/25 25/18 27/23 28/11 28/24 29/11 37/2 43/3 43/11 43/13 46/25 47/3 47/4 49/2 58/20 58/21 61/17 63/14 64/1 66/21 70/4 73/10 75/8 75/16 75/25 75/25 87/25 93/24 101/18 103/2 105/18 113/8 115/21 116/19 118/11 118/12 119/9 120/6 124/5 127/2 127/6 137/23 139/18 139/24 140/20 148/18 152/13 156/13 162/10 162/20 163/12 163/22 163/23 164/14 164/18 164/19 166/14 166/25 169/1 169/2 179/8 180/13 181/16 187/11 192/14 197/20 198/1 198/23 200/2 201/3 though [8] 23/11 41/3 49/5 50/18 82/15 88/19 101/4 122/25 thought [10] 58/10 90/7 158/25

198/24 202/19 thousand [4] 44/7 44/8 54/17 55/12 thousands [2] 11/22 185/13 three [18] 21/23 22/1 46/21 47/14 48/20 49/2 50/15 51/20 61/20 63/14 136/16 142/7 148/9 154/22 162/21 193/6 197/20 198/2 through [40] 18/22 24/16 26/3 32/5 33/24 35/25 44/15 46/22 51/2 51/3 51/10 63/5 63/25 68/24 84/1 84/13 88/17 88/19 92/19 107/9 110/12 110/14 110/21 112/11 113/19 120/6 120/16 123/11 127/21 130/1 130/5 131/9 131/21 132/18 163/11 163/14 163/20 175/14 197/2 206/14 throughout [3] 34/6 127/17 196/21 **Thursday [1]** 162/13 thus [1] 173/24 tie [1] 113/2 tight [1] 119/7 till [1] 13/3 time [65] 4/1 4/16 5/14 8/11 13/2 18/6 25/2 27/1 32/3 33/17 34/1 35/15 35/16 35/16 35/22 46/2 52/24 53/23 55/17 55/20 60/21 61/3 64/5 66/12 76/18 83/18 99/10 99/13 99/14 100/3 100/6 104/21 105/10 112/22 117/19 121/20 123/6 128/8 129/7 145/4 145/6 145/9 145/15 151/7 155/25 156/3 158/8 158/12 159/21 167/10 167/10 168/8 169/18 169/19 175/11 175/23 176/5 176/7 186/14 193/11 196/21 198/5 198/15 203/23 204/15 times [3] 44/17 92/1 185/11 tire [10] 173/12 173/14 173/16 173/18 173/20 173/23 174/1 174/4 189/17 189/18 187/2 189/17 189/17 190/9 tissue [8] 123/14 127/10 183/23 183/24 183/25 184/1 184/2 184/7 tissues [1] 110/7 titles [1] 88/10 today [10] 55/8 56/24 59/22 112/13 157/20 204/7 204/10 204/12 204/13 206/25 together [8] 31/16 65/5 65/9 72/24 119/6 131/4 148/22 166/6 told [7] 139/4 141/3 191/3 197/2 197/16 199/7 201/11 Tom [2] 4/8 160/25 took [10] 13/22 28/19 37/4 42/14 51/4 76/13 142/22 143/12 201/1 201/5 top [11] 31/20 32/7 34/25 35/19 36/2 36/3 37/14 38/22 47/18 104/5 131/19 topped [16] 29/23 41/23 43/16 43/18 43/25 49/21 51/5 54/23 65/22 66/15 67/5 67/17 68/5 73/1 78/10 79/6 Toronto [3] 107/14 108/10 109/3 torso [2] 131/23 131/24 Total [2] 118/19 118/24 toto [1] 178/18 touched [3] 117/21 117/22 138/2 touching [1] 116/21

touchy [1] 5/14 towards [5] 35/13 112/4 118/12 154/25 198/16 town [3] 108/25 199/14 199/15 Toxi [1] 74/22 Toxicology [4] 73/17 74/1 74/2 74/3 track [1] 82/9 Trader [1] 201/24 traditional [4] 142/25 183/22 184/10 184/21 trail [1] 67/11 train [2] 193/25 194/3 trained [1] 154/1 training [7] 109/17 111/2 136/10 154/12 154/18 156/7 179/7 transcribed [1] 208/11 transcript [5] 1/23 157/11 160/9 208/8 208/12 transcription [1] 208/11 translator [1] 170/10 transport [1] 152/14 trauma [3] 122/8 124/3 125/14 traveled [1] 199/16 treat [1] 16/20 trial [11] 1/4 1/4 4/4 118/25 194/23 204/17 205/1 205/4 206/2 206/8 206/22 trip[1] 155/23 Trooper [1] 164/10 trowel [1] 130/14 true [14] 12/9 30/23 68/10 78/25 79/3 79/20 95/1 131/9 167/16 185/1 200/6 201/3 201/14 208/12 truly [1] 45/17 try [13] 5/14 12/23 13/4 14/7 26/16 31/2 46/6 68/12 83/19 149/14 150/25 158/13 172/13 trying [17] 12/25 19/7 19/14 49/18 undertaken [3] 108/22 127/22 49/21 49/22 50/1 82/22 96/15 99/19 99/22 100/22 115/15 116/2 116/3 162/9 176/23 tube [58] 28/16 29/12 29/24 29/24 41/24 43/16 43/18 49/21 50/3 50/24 51/5 54/9 54/10 54/16 54/23 55/11 57/14 57/18 57/24 59/5 59/19 61/11 61/18 65/23 65/25 66/7 66/13 66/15 67/5 67/17 67/21 68/5 68/10 73/1 73/3 78/10 79/6 81/15 82/12 82/12 83/11 84/16 84/23 86/14 86/19 87/11 88/5 89/8 90/1 95/12 97/25 102/1 102/13 102/14 103/1 103/18 104/2 104/6 tubes [6] 34/9 43/25 57/21 66/2 66/4 103/2 Tuesday [2] 60/16 197/14 turn [2] 38/3 60/19 turned [1] 192/25 twice [3] 185/8 194/17 195/3 two [47] 23/25 25/18 28/5 28/11 28/12 31/11 36/18 36/19 37/11 37/17 37/18 39/12 39/16 40/25 41/6 41/13 44/8 46/16 49/10 58/13 58/20 58/21 73/13 75/8 76/15 80/22 80/22 86/22 88/1 91/14 105/18 122/10 122/12 125/23 137/6 137/23 152/10 154/22 158/21 160/6 166/20 169/24 182/22 189/13 200/2 203/5 203/21 31/12 43/14 49/21 56/12 67/22

type [11] 25/23 65/18 65/21 65/25 66/18 130/14 136/6 144/8 171/10 177/3 187/16 types [5] 16/5 34/7 127/1 136/4 171/11 typical [2] 60/21 186/6 typically [8] 26/21 34/13 36/1 42/10 44/3 44/7 66/19 116/16

U.S [2] 9/18 110/15 Uh [1] 89/4 **Uh-huh** [1] 89/4 ultimate [3] 132/12 139/20 140/18 ultimately [2] 13/3 89/16 unable [1] 80/9 unattended [2] 177/17 177/21 unaware [1] 11/16 unbiased [1] 112/8 uncertainty [1] 76/22 uncovered [1] 12/19 under [8] 21/15 23/3 37/10 78/2 78/4 91/23 92/20 114/11 undergraduate [2] 108/23 109/16 understand [33] 6/5 8/21 11/2 13/4 17/9 17/25 19/6 32/25 35/1 40/11 40/15 65/11 94/16 114/13 125/9 129/2 137/16 139/10 140/14 validation [2] 27/22 60/24 182/16 192/21 194/11 197/15 202/17 understanding [13] 41/19 69/9 76/12 89/18 136/17 137/13 137/19 144/7 153/17 180/18 181/10 184/5 varies [1] 169/22 201/13 understands [1] 205/14 understood [6] 88/6 140/12 156/25 various [7] 109/11 122/20 131/21 183/25 190/25 191/22 undertake [2] 112/8 190/6 184/4 undetermined [2] 137/11 148/18 unexpected [3] 30/13 96/14 96/19 **Unfortunately [2]** 27/14 33/9 unintended [1] 159/9 unit [4] 118/19 118/21 118/24 170/12 universally [2] 78/6 131/9 university [10] 6/13 106/16 107/2 107/14 107/17 108/3 108/10 108/21 108/24 109/10 unknown [6] 10/12 45/20 60/25 95/2 95/2 144/19 unknowns [1] 95/5 unless [4] 22/8 80/3 131/3 205/7 unnatural [1] 123/22 untested [1] 22/1 until [4] 5/7 109/25 117/22 130/10 untrained [2] 154/6 155/4 unusual [2] 92/4 92/5 upcoming [1] 110/14 **upkeeps [1]** 199/16 upon [7] 102/4 115/3 132/24 133/14 135/16 149/18 159/15 upper [4] 35/1 119/25 121/17 133/14 ups [1] 103/24 upside [2] 60/6 60/7 use [36] 6/4 8/1 8/17 11/11 12/11 15/21 16/6 17/8 19/3 19/5 19/7 19/15 21/12 28/4 31/10 31/12

68/12 69/21 97/15 97/16 97/19 98/21 99/3 103/7 103/10 119/4 169/3 170/3 177/17 194/22 198/21 used [21] 8/5 15/24 16/11 18/23 30/10 43/11 63/13 69/22 75/10 78/6 78/9 78/12 83/23 87/14 129/9 134/18 138/12 142/25 172/24 173/12 189/18 user [3] 8/5 9/25 67/19 uses [2] 7/19 75/19 using [13] 15/20 24/10 27/17 42/20 65/15 75/22 79/2 97/22 118/18 118/25 121/24 131/4 168/17 usually [10] 20/4 25/20 52/6 60/25 61/1 114/1 115/5 123/16 165/10 191/5 utilize [1] 190/7

vacutainer [2] 67/14 102/13 vacuum [5] 68/1 68/10 68/11 102/24 102/25 valid [9] 6/6 7/24 8/21 10/14 13/7 19/2 23/14 77/19 78/4 validate [1] 60/23 validated [1] 55/9 144/9 146/12 147/1 147/18 149/19 validity [3] 10/18 18/25 21/14 150/18 160/1 160/21 168/22 van [9] 197/13 197/17 198/3 199/3 201/21 202/4 202/5 202/12 203/7 vapor [1] 171/16 variability [2] 90/24 99/21 variables [2] 176/22 177/20 variety [6] 9/9 107/24 110/8 127/4 172/23 181/16 135/11 161/18 161/23 180/3 vary [2] 44/1 132/5 varying [2] 167/6 190/8 vast [1] 179/24 vehicle [2] 104/13 200/7 vehicles [4] 200/2 200/9 201/9 201/12 vein [1] 102/25 velocity [1] 122/22 ventilating [1] 17/12 vents [1] 17/13 verb [1] 138/11 version [1] 75/4 versions [1] 75/15 versus [1] 26/2 vertically [1] 130/9 very [76] 4/9 4/15 8/19 10/19 10/22 11/21 12/6 17/2 17/3 18/5 22/16 25/20 36/9 38/1 38/3 43/22 43/22 44/4 46/13 48/22 52/7 52/17 52/18 52/21 61/3 61/6 61/6 62/15 62/15 70/2 77/4 79/15 80/19 80/19 80/20 80/20 81/4 88/8 90/7 91/6 91/9 96/1 103/16 105/7 105/18 109/1 109/20 110/3 110/25 113/9 113/18 115/8 127/2 128/19 129/1 130/13 131/2 132/24 141/19 150/23 159/20 166/18 168/2 174/9 174/15 177/12 182/11 182/12 182/12 187/2 194/6 195/11 195/15 196/6 200/7 201/1 via [1] 112/10 vial [2] 84/5 102/17 video [2] 58/7 59/17 videotape [1] 57/10

138/2 138/4 140/25 141/1 141/18 view [3] 128/14 139/4 139/12 views [6] 161/18 161/19 161/20 161/22 161/24 161/24 vis [2] 124/19 124/19 vis-a-vis [1] 124/19 visit [2] 178/20 205/9 vitae [1] 107/5 vital [1] 204/22 volume [7] 87/21 87/25 88/17 94/12 94/13 106/10 170/21 volunteer [1] 205/18 volunteered [1] 41/22 W-i-e-g-e-r-t [1] 195/21 wait [2] 5/6 140/2 walking [1] 116/11 want [35] 6/5 14/5 18/12 18/17 31/11 54/1 76/9 84/1 84/12 88/19 90/9 94/2 97/1 101/14 110/20 112/25 114/3 124/25 133/9 140/2 140/11 150/24 154/4 159/8 171/7 172/13 175/23 177/2 177/5 177/8 177/12 178/20 190/20 194/22 207/6 wanted [8] 9/25 16/2 68/8 68/19 145/19 159/15 178/6 198/5 197/24 warm [2] 62/21 63/1 wasn't [16] 12/5 23/24 24/3 29/4 44/4 71/23 80/11 89/22 92/7 101/11 101/12 124/25 129/10 149/21 199/3 203/22 watch [3] 18/1 205/5 205/12 **watching [1]** 204/18 water [13] 11/19 20/1 56/10 80/21 80/23 81/10 81/11 127/12 127/12 128/1 170/16 170/22 170/23 way [38] 9/17 10/18 12/2 12/4 13/3 14/16 22/6 38/2 49/16 49/17 54/21 55/14 55/14 58/5 65/8 83/13 87/13 90/20 97/16 97/17 97/21 103/9 111/21 116/9 117/5 118/7 119/11 122/4 128/25 130/20 143/20 158/12 165/22 168/23 172/18 186/5 188/5 189/15 ways [2] 83/15 118/6 we [178] 4/25 7/3 16/4 18/17 22/4 22/6 22/8 28/9 28/9 28/13 28/24 32/8 32/17 32/18 32/18 33/1 33/19 39/6 42/11 42/11 45/7 46/16 48/8 48/11 48/11 49/11 50/15 51/18 53/4 53/4 55/14 55/25 56/21 56/24 57/4 57/10 59/16 61/24 62/1 62/7 62/8 62/12 62/16 63/19 70/24 71/9 76/17 79/21 83/21 83/25 84/2 86/3 86/13 91/2 92/18 94/9 94/11 94/12 95/3 96/3 105/4 105/6

106/10 106/14 106/15 107/21

116/19 116/21 116/23 116/25

123/13 123/16 125/12 125/13

130/18 130/22 130/23 131/4

131/12 132/9 132/12 133/10

133/11 133/17 133/20 133/20

135/13 136/17 136/18 136/20

109/22 110/17 111/14 112/7 112/8

114/22 114/25 115/3 115/7 116/9

117/1 117/6 117/14 117/24 118/23 119/8 119/9 119/11 119/21 122/17

122/17 122/19 123/4 123/6 123/8

127/3 128/9 128/9 129/10 130/14

141/20 143/8 146/5 146/7 147/15 148/4 149/10 150/6 150/7 150/7 150/9 151/3 152/9 154/1 158/3 158/14 158/20 159/1 159/11 160/2 170/10 170/21 171/11 171/12 171/12 171/14 171/16 171/18 172/23 177/17 179/4 180/19 180/20 182/3 182/11 184/20 188/2 windows [1] 63/4 189/4 189/8 189/8 189/9 190/7 196/14 196/14 196/17 196/21 196/22 199/2 204/9 204/12 206/7 206/22 207/5 we'll [22] 5/6 5/14 7/14 33/14 64/5 64/6 64/11 88/18 104/23 105/7 105/7 107/7 118/17 124/23 131/20 159/20 195/11 we're [35] 4/3 10/11 22/3 49/10 49/16 53/13 69/8 79/14 83/25 91/4 91/9 94/8 94/12 104/21 115/13 115/15 115/15 116/3 116/10 116/16 119/5 120/1 120/2 143/5 145/3 149/16 165/22 169/2 169/11 170/11 172/18 176/4 179/2 192/19 204/13 weak [2] 80/20 86/11 weather [4] 168/7 177/6 193/15 web [2] 75/4 205/10 websites [1] 205/10 Wednesday [1] 197/14 week [6] 10/21 56/13 60/16 60/18 197/20 203/21 weekend [2] 205/16 206/20 weeks [1] 203/21 weight [1] 186/1 Welcome [1] 155/21 well-functioning [1] 62/25 well-known [1] 109/1 went [7] 11/25 44/15 44/19 46/10 68/24 109/25 180/8 were of [1] 181/15 weren't [1] 14/2 western [1] 113/18 what's [16] 14/20 20/18 22/7 36/2 36/3 42/13 45/25 48/22 50/18 51/14 52/16 61/25 114/20 153/13 167/1 198/10 whatever [7] 18/24 21/24 91/22 100/2 149/1 159/17 167/11 whatsoever [1] 139/1 wheat [1] 171/22 whenever [1] 172/12 wherever [1] 138/20 whether [55] 8/8 13/5 13/11 17/8 17/9 17/14 18/2 18/22 19/2 21/11 21/14 21/15 21/22 21/24 23/14 23/23 24/2 27/8 29/2 42/23 47/25 49/23 49/24 50/2 52/1 54/21 61/9 66/9 66/14 69/14 70/19 70/21 70/22 78/10 85/12 86/10 86/16 90/19 95/3 97/3 99/19 100/14 101/16 120/3 124/5 125/22 126/6 133/7 138/9 151/16 174/24 184/14 **X** 191/15 191/24 192/2 while [8] 31/9 34/13 105/13 148/10 165/22 167/8 169/11 170/11 white [3] 132/13 154/25 155/6 who's [1] 125/18 whole [10] 5/14 9/11 9/12 13/8

43/2 43/3 80/6 98/1 99/7 149/16

|whose [1] 44/14 wide [2] 9/9 113/19 WIEGERT [9] 2/15 2/20 195/14 195/16 195/21 195/24 198/10 199/10 200/7 wild [1] 174/24 **Willis [1]** 1/9 wind [1] 63/4 winter [1] 168/14 WISCONSIN [11] 1/1 1/3 1/12 1/14 1/16 4/2 155/21 155/24 162/4 208/1 208/6 within [11] 108/12 111/6 117/11 125/11 126/9 130/3 130/8 136/4 136/14 151/12 163/15 135/13 147/9 151/6 157/18 158/16 without [8] 21/3 98/7 107/8 107/9 116/20 129/14 146/10 158/14 witness [20] 4/16 4/20 5/1 5/6 81/3 105/5 105/11 105/20 105/25 112/17 145/16 145/22 150/12 156/1 159/2 159/6 163/2 195/13 195/17 204/3 witnesses [5] 2/2 148/4 199/7 204/6 204/10 woman [4] 196/2 198/13 198/15 201/12 wonder [1] 106/14 wood [5] 144/8 148/16 172/24 173/3 187/14 wooden [1] 130/15 woods [1] 168/6 word [4] 121/20 138/1 169/3 178/1 words [14] 54/2 71/24 88/8 116/20 131/13 139/20 140/7 141/24 143/22 146/23 166/12 181/3 182/6 183/6 work [38] 6/18 6/25 8/11 8/14 9/20 11/17 14/9 14/18 15/1 15/2 16/2 18/2 18/15 18/18 26/19 27/16 27/17 31/9 84/2 108/20 110/2 110/24 111/2 113/1 113/4 115/7 115/23 117/1 117/5 117/6 121/1 121/2 126/13 156/8 156/9 158/13 165/23 168/22 working [10] 7/2 15/20 15/23 34/14 103/15 114/10 115/9 117/3 194/21 205/15 works [2] 67/5 67/6 world [2] 26/8 30/2 worried [1] 172/18 worth [1] 11/23 worthless [1] 101/8 wouldn't [10] 51/21 99/17 169/16 169/17 184/23 185/2 186/10 186/11 189/8 200/15 wound [4] 122/16 123/1 123/9 125/23 wounds [8] 122/10 122/13 123/3 124/5 124/13 126/3 126/6 183/10 write [2] 165/7 165/10 writing [1] 206/18 written [4] 18/2 52/23 110/10 111/22 Xcalibur [1] 35/10 Xerox [1] 93/22

yard [2] 143/1 199/17 year [4] 54/9 55/6 57/18 168/9 years [10] 10/10 15/10 26/20

Υ	
years [7] 54/22 58/1 103/12 120/15 121/18 156/16 156/18 yesterday [4] 56/24 196/3 203/20	
203/24 yet [8] 57/2 95/12 117/21 144/16 149/16 168/14 170/10 188/12 you'll [1] 30/19	
you're [9] 11/15 18/14 51/19 136/5 136/5 170/24 194/2 200/13 200/13	
young [1] 196/2 yourself [8] 65/14 113/13 114/21	
122/7 171/6 179/19 190/3 190/13 Yup [2] 37/16 98/5	
Z	
zipper [1] 180/11 zippers [1] 181/13 zoom [14] 32/8 36/4 46/9 46/11 46/13 48/24 48/25 49/4 49/5 52/21 53/4 85/18 86/1 88/25 zoomed [3] 51/15 52/18 83/21 zooming [2] 46/5 53/2 zooms [1] 53/6	