Volume 3

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UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

Before The Honorable Vince Chhabria, Judge

EDWARD HARDEMAN,	)	
	)	
Plaintiff,	)	
	)	
VS.	)	**NO. C 16-00525 VC**
	)	
MONSANTO COMPANY,	)	
	)	
Defendant.	)	
	)	

San Francisco, California
Monday, February 25, 2019

TRANSCRIPT OF PROCEEDINGS

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I N D E X

Monday, February 25, 2019 - Volume 3

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P R O C E E D I N G S

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THE CLERK: Calling Case Number 16-CV-00521, Hardeman versus Monsanto Company, et al.

Counsel, please step forward and state your appearances for the record.

MS. WAGSTAFF: Good morning, Your Honor. Aimee Wagstaff on behalf of Mr. Hardeman, and along with me is Ms. Jennifer Moore.

MR. STEKLOFF: Good morning, Your Honor. Brian Stekloff on behalf of Monsanto. Along with me are Tamarra Matthews Johnson, Rakesh Kilaru and Julie Rubenstein.

THE COURT: Good morning.

Okay. What do we need to talk about this morning?

MR. KILARU: Your Honor, we had two pretty quick issues just related to the opening.

THE COURT: Okay.

MR. KILARU: The parties exchanged opening exhibits over the weekend, and there is one exhibit that the Plaintiffs put on their list that we had some concerns about. There are two actually. It is two sets of requests for admissions, one from the Johnson trial and then one from this case.

THE COURT: Okay.

MR. KILARU: So we would object to any use of the

Johnson admissions to this trial, both because there is already a ruling that other litigation can't be mentioned, I believe, and then also because the admissions for that case were for that case only. But the actual admission is an admission -- let me pull it up to have the exact words. In this case it is a request for admission that Monsanto has never warned any consumer that exposure to GBS is associated with non-Hodgkin's lymphoma. We think that getting into the issue of what we have warned about is a Phase Two issue and not a causation issue.

THE COURT: Certainly is.

MS. MOORE: Your Honor, we have no intention of mentioning the Johnson trial during opening or at any other point during this trial. The slide, which is a party admission or request for admission, is not mentioning the Johnson trial. It is important that Your Honor knows that.

The second thing is we have an agreement that all discovery, regardless of where it comes from, is fair game in this case. The issue about whether this is Phase One or Phase Two is that our concern is the jurors are coming in here with certain assumptions, and we heard through jury selection that some of the assumptions was did Mr. Hardeman use the product correctly; did he use it as was warned.

THE COURT: Did he describe the request for admission in the response accurately?

MS. MOORE: That's correct, Your Honor.

THE COURT: It is not admissible in Phase One, clearly.

MS. MOORE: Thank you, Your Honor.

THE COURT: Not even close.

MS. MOORE: Thank you, Your Honor.

THE COURT: Anything else?

MS. MOORE: Your Honor, one issue and it relates to Dr. Ritz who is our first witness today. It came about during Dr. Portier's cross-examination last week that there was a series of questions asked by Monsanto's counsel that were definitely geared towards case specific opinion; and as a matter of the bifurcation of this matter, the Court is aware that Dr. Portier was disclosed as a general causation expert only. And so these questions were, did you review Mr. Hardeman's medical records; do you know that he has hepatitis; did you know that he had that. It was a series of questions intended to impeach Dr. Portier's credibility to show the jury he doesn't know anything about this particular case. And that, you know, is improper, Your Honor. And our concern is that this is the same thing they are going to attempt to do with Dr. Ritz on cross; and we would like a ruling in advance so those questions aren't asked of Dr. Ritz.

THE COURT: Why isn't it easy for a witness to deal with that simply by saying, Well, I wasn't asked to opine on whether Mr. Hardeman's NHL was caused by Roundup? I'm only

giving an opinion on whether it is capable of causing cancer generally?

MS. MOORE: Well, for us, for lawyers and judges, we would understand that. My concern is that the jury doesn't -- will not understand that that is a byproduct of the bifurcation of this matter and that Dr. Ritz was solely disclosed as a general causation expert, not a case specific expert. There is no doubt that they are going to use that to their advantage. Even though they asked for the bifurcation of this case, they are now going to try to use that to their advantage to say she doesn't know anything about Mr. Hardeman to discredit everything she is trying to say about general causation.

THE COURT: Saying she doesn't know anything about Mr. Hardeman doesn't discredit her opinion on general causation if she is capable of accurately describing what her opinion on general causation is.

MS. MOORE: Well, she is, Your Honor.

THE COURT: So obviously if, you know, presumably after her direct, it should be not necessary for Monsanto to establish the point that you are describing because Dr. Ritz will already have established it in her direct; but if Monsanto wants to ask a couple questions to hit that point home, I don't -- I don't see what the big deal is.

MS. MOORE: Well, our position is it would go beyond the scope of direct.

THE COURT: At some point I will shut it down if it goes on for too long; but I don't think -- I don't think I can make a ruling in advance that that sort of questioning is inappropriate because it depends on how the direct comes in.

MS. MOORE: Okay.

THE COURT: And if there is any implication, she has an opinion of Hardeman, then, of course, it would be appropriate on cross; and a couple questions on it might be appropriate on that topic. Might be appropriate on cross regardless. Those questions and answers would do nothing to discredit Dr. Ritz.

MS. MOORE: Okay. Thank you, Your Honor.

And so we will take that up, you know, on direct. She is not going to be talking about Mr. Hardeman in particular.

Going back to, Your Honor, about the instruction about the RFA, at the appropriate time, can we have a curative instruction that the jury is not to consider warnings in Phase One?

THE COURT: The jury is not to consider warnings?

MS. MOORE: Well, the whole issue is, you know, was whether Mr. Hardeman using the product, that is our concern, that the jury is going to come in here with assumptions about --

THE COURT: What does that have to do with whether it caused his cancer? The first phase, as we have been discussing

for the last couple months, is whether it caused his cancer.

MS. MOORE: Right. I understand that, Your Honor. Our concern is that the jury is going to come in here with assumptions, which is something that Your Honor pointed out in your MIL ruling in Pretrial Order Number 81, that you had this concern with regard to general assumptions that the jury may make, that would allow Monsanto -- I believe, this was in response to Motion --

THE COURT: What is the assumption that you think the jury is going to make that you want cured by an instruction about warnings?

MS. MOORE: That the label said to wear gloves or a mask --

THE COURT: But what does that --

MS. MOORE: -- or pants.

THE COURT: But what does that have to do with whether that caused cancer? I don't understand.

MS. MOORE: Because they can say, Well, if he had been wearing gloves or a mask or a hazmat suit or pants or closed-toe shoes, then he wouldn't have gotten cancer.

THE COURT: Yeah, but he still got it from the Roundup. I mean, if your argument is to be believed, he still got it from the Roundup; and it doesn't matter at Phase One whether he was wearing gloves or not.

MS. MOORE: The only thing there is -- the warning

never says you have to do that. The warning is completely silent.

THE COURT: But they are not going to hear any evidence of a warning or lack of a warning at Phase One, so why does it matter?

MS. MOORE: Well, it matters because they may come in here with an erroneous assumption that you do have to wear those things.

THE COURT: But I don't understand why that is -- why that is relevant to whether his cancer was caused by Roundup or something else.

MS. MOORE: I understand, Your Honor.

THE COURT: Anyway, you can -- before the close of Phase One, you can request instructions based on -- based on how the evidence comes in at trial. But certainly I'm not going to give them something like that during Phase One, and I would be shocked if it were appropriate to give them an instruction like that at the close of Phase One before their deliberations.

MS. MOORE: That's fair. Thank you, Your Honor, for allowing us to re-visit it.

MR. KILARU: We have one thing about the deposition ruling that my colleague will address.

MS. RUBENSTEIN: Good morning, Your Honor. Julie Rubenstein on behalf of Monsanto. Sorry about that.

We were hoping that Your Honor would reconsider a couple of rulings from the treating depositions. I think -- I don't need to take them all up right now. One of them may potentially be relevant to openings.

THE COURT: Go ahead.

MS. RUBENSTEIN: Do you have transcripts with you? It not, I will hand you one.

THE COURT: I don't.

MS. RUBENSTEIN: This one has to do with the deposition of Dr. Ye.

THE COURT: Okay. Remind me. It might be fresh in my mind. Tell me about it.

MS. RUBENSTEIN: Dr. Ye is Mr. Hardeman's treating oncologist.

THE COURT: Right. But remind me of the --

MS. RUBENSTEIN: And, Your Honor, the part that I wanted to raise with you was that page 143, there is a section of testimony beginning actually at the bottom of 142 that you did allow in regarding the cause of non-Hodgkin's lymphoma generally.

THE COURT: If I remember correctly, I allowed in up to line 2, and then I said line 3 and 4 is not admissible.

MS. RUBENSTEIN: That's right, Your Honor. We would respectfully ask that you reconsider that ruling. I presume that you sustained the objection as to those two lines on the

basis of the objection here that it calls for expert testimony, and we believe that this is really just percipient witness testimony about his treatment, diagnosis and opinion --

THE COURT: I understand --

MS. RUBENSTEIN: -- of Mr. Hardeman.

THE COURT: -- but I think from the remainder of the testimony that I allowed in, it is fairly clear, that A, the oncologist didn't inquire into the cause of Mr. Hardeman's NHL; and B, the oncologist is not offering any opinion on the cause of Mr. Hardeman's NHL.

MS. RUBENSTEIN: That's right, Your Honor.

THE COURT: I don't understand. I thought that you have to draw lines when you are going through this kind of testimony. And I thought, you know, that is sufficient to avoid -- I mean, I thought the general principle -- one of the general principles that I applied when I was going through this testimony is we want to make sure the jury is not under a misimpression that the doctors whose -- who are being called by the Plaintiff believe that his -- that his cancer was caused by Roundup; right?

And so I allowed enough of that testimony in to establish that none of these doctors inquired into whether his cancer was caused by Roundup and none of the doctors is offering an opinion on whether his cancer was caused by Roundup. But, you know, to -- I don't understand, I guess -- maybe it wouldn't be

a huge deal to let that in; but in light of the fact that the testimony being allowed in establishes that, I don't really understand why it is important to get that in.

The other thing about that question and answer is that the way the question was asked, it sort of goes beyond the issue of whether the doctor looked into it or whether the doctor has an opinion. The question and answer could leave the impression that the doctor believes that there is no known cause of the cancer as opposed to not having an opinion about whether there is a cause to the cancer. So I think that question and answer is misleading a little bit.

MS. RUBENSTEIN: Well, Your Honor, I think that -- I think you might have hit the nail on the head. I think this testimony is different from the testimony about not having an opinion in the sense that the doctor says, "I cannot attribute a cause to this" --

THE COURT: I understand --

MS. RUBENSTEIN: -- "this cancer," and we think it is relevant.

THE COURT: I understand your argument. I'm not going to reconsider that ruling.

Was there another one?

MS. RUBENSTEIN: Well, there was a few more; but none of the others are relevant for openings, so I don't know if Your Honor would prefer to take them up at a different time

before the testimony is played. I don't want to waste the Court's time now.

THE COURT: If you want to knock them out now -- I mean, we have a few minutes if you want to knock them out now.

Let me do this first. The only other thing I wanted to talk to you-all about is the depo designations. When am I going to get the other depo designations so that I can review them and not be -- and not be forced to review them at the 11th hour?

MS. MOORE: Your Honor, we are diligently working on that, both sides. We had meet-and-confers on Saturday and Sunday, and several e-mails last night, even after midnight between us. My understanding is we are finalizing Dr. Ross and Dr. Reeves to be filed this morning with the Court, and we can hand over hard copies of that, those transcripts similar to how it was done with Dr. Turley. And then we are also finalizing Dr. Goldstein's corporate representative deposition and Dr. Blair. So there should be four that should be ready to go this morning that we can discuss this afternoon.

I understand Your Honor needs time to look at it. There might be some global issues that we can address after the jury is excused today that will give us guidance on many of the issues that are still left. We have narrowed it done pretty substantially.

MS. RUBENSTEIN: Your Honor, I would just flag that

Monsanto does object to the admission of some of the testimony that Ms. Moore just mentioned, and that will be noted in the pleading that gets filed.

THE COURT: Okay. So do you want to knock out a couple of these other issues?

MS. RUBENSTEIN: Sure. I would be happy to.

So the other one I have is also in Dr. Ye's transcript on page 132, lines 2 to 13.

THE COURT: Okay.

MS. RUBENSTEIN: Sort of the same argument as before, Your Honor, we believe that this is all based on his care, treatment and opinion about Mr. Hardeman from having been his treating doctor.

THE COURT: I understand that. The age -- the concept of age being a risk factor is a controversial concept, and I think that the problem with bringing this doctor's testimony in on that topic is that it is not clear whether the doctor is using that sort of in more of colloquial terms or more precise terms, precise scientific terms. And you didn't get into with this -- nobody got into it with this doctor, who is not serving as an expert witness, what it means to call age a risk factor and how that might be different from calling hepatitis C a risk factor or Roundup a risk factor. And so I think it is potentially misleading to have it here, and I'm not reconsidering that ruling.

MS. RUBENSTEIN: Thank you, Your Honor.

The next one I have is, I believe, in the deposition of Dr. Turk, so I can hand that to you as well.

THE COURT: Sure. Should I hand this one back down? I am trying to avoid --

MS. RUBENSTEIN: Sure. I can certainly take that one back.

THE COURT: -- accumulating too much paperwork up here.

MS. RUBENSTEIN: And this one, Your Honor, is Dr. Turk at page 119 to 120.

THE COURT: Okay.

MS. RUBENSTEIN: And this is testimony, Your Honor, about --

THE COURT: Hold on. Let me --

MS. RUBENSTEIN: Absolutely. Lines -- page 119, line 17 through page 120, line 9.

(Whereupon, a brief pause was had.)

THE COURT: Okay.

MS. RUBENSTEIN: This testimony is specific enough to Mr. Hardeman in the sense that it is talking directly about Dr. Turk's medical records and whether --

THE COURT: Dr. Turk made it clear earlier that it wouldn't have been Dr. Turk's role to get into whether his NHL was caused by Roundup.

MS. RUBENSTEIN: Well, we think it is significant that the discussion was never even had that Mr. Hardeman never asked --

THE COURT: If I recall correctly, there was -- I allowed some testimony about that in from --

MS. MOORE: You did, Your Honor.

THE COURT: -- from Dr. Ye, the oncologist. It is not coming in from this doctor. I'm not reconsidering this ruling.

MS. RUBENSTEIN: Thank you, Your Honor.

I have one last one. This is from Dr. Turley, so I will hand that up.

MS. RUBENSTEIN: This is very similar, Your Honor. Page 41, lines 3 to 6.

THE COURT: For the same reason, I'm not reconsidering that ruling.

MS. RUBENSTEIN: Okay. Thank you very much, Your Honor.

MS. MOORE: We don't have anything else, Your Honor, for this morning.

THE COURT: Great. We will be back here at 8:30 sharp to bring back the jury.

I have one more item. I apologize. Just to preview it for you, so the juror who we talked about --

MS. MOORE: Yes.

THE COURT: -- the other day, I spoke with his

employer. And here is the situation, and what I told him is that we will talk to him about it after the trial day today.

MS. MOORE: Okay.

THE COURT: The situation is that he regularly works five shifts -- Wednesday, Thursday, Friday, Saturday and Sunday. He, of course, could continue working Saturday and Sunday and could continue working Thursday. He is going to lose Wednesday and Friday.

I spoke with the employer about paying him anyway. Unfortunately his employment is covered by a collective bargaining agreement, and it would likely be illegal for Kaiser to pay him for his jury service for those two days and -- and he -- so, you know, he is concerned.

I spoke with the employer about it on Friday, and I spoke with him about it this morning. He continues to be very concerned given that his wife's hours were cut on the day of jury selection; that he is not going to be able to serve. So I didn't -- I didn't tell him one way or another how it was going to come out, but I said that we would keep him afterwards today and talk to him further and that I would permit the lawyers, if they wanted to, to ask him questions and then I may have some additional questions for him. Okay?

MS. MOORE: Thank you, Your Honor.

THE COURT: That will happen when we are done. See you in a few minutes.

MS. MOORE: Thank you.

THE CLERK: Court is in recess.

(Whereupon, a short break was had.)

(Proceedings were heard in the presence of the jury:)

THE COURT: Good morning. Good morning, everybody. As I mentioned last time, we are expecting this trial to last four to five weeks. We understand that that is a significant investment of your time, so we are doing a number of things to make sure that we are going to run this thing as efficiently as possible and not waste any of your time. One of those things, by the way, is that I'm imposing time limits on both sides and they will be on a clock throughout the trial.

Another thing is we will be conducting the trial in phases, which means that we will be calling on you to deliberate on certain questions as we progress. In the first phase, you will be asked to determine simply whether Mr. Hardeman can prove that his use of Roundup caused his non-Hodgkin's lymphoma. The medical causation question is what the lawyers' opening statements will be about at this point, and we will be hearing from witnesses on that subject as we begin the trial.

Later, in subsequent phases, we will be addressing different issues, different aspects of Mr. Hardeman's claims as the trial progresses. And the lawyers will be able to speak to you on those different topics as we move forward, but right now

the first question is the medical causation question; and we will begin with the lawyers' opening statements.

Ms. Wagstaff.

OPENING STATEMENT

MS. WAGSTAFF: May it please the Court, Counsel, ladies and gentlemen of the jury, good morning.

Before I introduce myself, I want to take a moment to thank you guys. We live in a country where we are allowed to have a jury by our peers, and it is a wonderful thing that we have; but what comes along with that is the burden of coming here for a month for you guys. We know it is a big investment on your time. We know it is an investment by you, for your families, for your jobs, for your animals, your dogs, for everyone.

So for that, I thank you. I thank you on behalf of my team and my client and on behalf of Monsanto. So thank you.

My name is Aimee Wagstaff, and I represent Mr. Hardeman in his case against Monsanto. You had an opportunity to meet my colleague Jennifer Moore last week, and we have the honor and privilege of representing the Hardemans.

You also met Ed Hardeman last week. I would like to take a moment to introduce you to his wife, Mary Hardeman, who was unable to make it last week.

Mary and Ed met back in 1975. They met here in the Bay area. They met at a graduation party, and pretty soon after Ed

asked her out on their first date and they went -- it was on New Year's Eve, wasn't it? And they went out on New Year's Eve, and the surprise was that Ed brought his entire family on that first date; and pretty soon thereafter they knew they were going to be together for the rest of their lives. So they got married in 1979, and they have been together ever since; and she really has been the rock for Ed throughout this entire process.

So let me tell you their story. On Christmas Day in 2015 -- '14 -- I'm sorry, Christmas Day 2014, Ed wakes up and he finds a lump on his throat. He is getting ready to go down to Daly City where his niece and nephew live. His sister had recently passed away, and it was really important for him to spend the holiday with his niece and nephew.

So he wakes up and he sees this lump on his throat, and he is shaving his face and he calls Mary in and says, "What is this lump? What is going on?"

She says, "I don't know. I don't know what it is. Let's go to" --

THE COURT: Ms. Wagstaff, can we limit the opening statement to the topic that Phase One is about, as we have discussed.

MS. WAGSTAFF: Sure.

THE COURT: Thank you.

MS. WAGSTAFF: So Mr. Hardeman goes to the doctor the

next day, and he looks for his treating physician who is not there. He is on vacation because it is December 26th.

So he goes in and he meets with the treating physician, the on-call doctor, who tells him to just monitor it. You will hear -- you will hear Mr. Hardeman tell you that he didn't want to wait; that he knew something was going on. So he comes back to Kaiser where he is treated. The Hardemans live up in Santa Rosa, just north of here. So he goes back after his family physician comes back from the holiday. And on the first visit Dr. Turk sends him down to the ENT, which is the ear, nose and throat doctor. So he goes into the ENT doctor and he starts getting needles drawn; starts getting needles poked in there; biopsies taken. They want to pull out tissue. They want to figure out what is going on in his neck. Blood is drawn.

He has to wait for the results.

Finally, the results come back and the tissue is dead. So he has to go back in and get drawn again, get needles poked back into his neck again.

THE COURT: Can we have a sidebar, please?

(The following proceedings were heard at the sidebar:)

[redacted]

[redacted]

(The following proceedings were heard in open court:)

MS. WAGSTAFF: Eventually Mr. Hardeman is diagnosed with cancer on Valentine's Day 2015. He is diagnosed by Dr. Ye, his treating oncologist from Kaiser, up in Santa Rosa. Ad Dr. Ye diagnoses Mr. Hardeman with Stage 3 non-Hodgkin's lymphoma. He diagnoses him with a subtype of non-Hodgkin's lymphoma called diffuse large B-cell lymphoma. But you will hear testimony it is a very aggressive form of non-Hodgkin's lymphoma.

So we are here today to look at the whole puzzle. This case, and your job is to put all of the pieces together and figure out what caused Mr. Hardeman's cancer. You heard the judge tell you a few moments ago that this trial is going to be in phases, and the first phase is going to be what caused Mr. Hardeman's cancer.

And so myself and Mrs. Moore are going to give you pieces to that puzzle over the next few weeks. What we ask of you is that you put all those pieces together to help figure out what causes -- what caused his lymphoma.

Now, there is no dispute that Mr. Hardeman has been diagnosed with non-Hodgkin's lymphoma, just to be clear. So I have put out a map, and I want to tell you what is going to happen for the next few weeks. If I was in your shoes, I would want to know what is going to be going on.

So, first, we have Phase One. And as the judge just told you, you guys will have one question to answer: Was Mr. Hardeman's exposure to Roundup a substantial factor in causing his non-Hodgkin's lymphoma?

MR. STEKLOFF: Your Honor.

THE COURT: We will get to Phase Two when we get to Phase Two. You can take down that slide.

MS. WAGSTAFF: I moved on.

We are going to go -- I'm going to tell you what is going to happen in Phase One. First, we have opening statements, which I'm doing. Then Monsanto's lawyer will go right after me, and Mr. Hardeman is going to put on his case.

We are going to bring in witnesses. We are going to show you documents, and we are going to give you other pieces of evidence. What I'm saying right now is not evidence. I'm just sort of explaining what we are going to show you.

Then Monsanto is going to come up, and they are going to present to you witnesses; give you evidence and give you other testimony.

Then we are going to come up and we are going to do closing arguments. And I'm going to stand up, just like I am right now, and I'm going to argue what you have just heard. And Monsanto's lawyer will do the same thing.

And then you guys will decide whether or not Mr. Hardeman's exposure to Roundup caused his non-Hodgkin's

lymphoma.

Now, throughout the course of the next few weeks, we are going to bring you some witnesses. We are going to bring you witnesses from Monsanto, both current and former employees. Now, this trial is happening in San Francisco, and these people don't live in San Francisco, so we can't force them to come here. So what we have done over the past couple of years is we have taken depositions of Monsanto employees. And we can't force them to come here, like I just said, so we will play them to you --

MR. STEKLOFF: Your Honor, may we approach?

THE COURT: I know what your objection is going to be. It is overruled.

MS. WAGSTAFF: So we will play them for you via deposition. So you will see them on the monitors right in front of you. We intend to bring you deposition testimony from Dr. William Reeves, Dr. Daniel Goldstein, Dr. Donna Farmer and Dr. David Saltmiras. And those are all either current or former Monsanto employees.

Now, as the trial goes along, we may add a few other employees or we may take one of those depositions down. Those are who we intend to bring.

But here is what I'm going to talk to you about today. There is three real phases of my opening statement I want to go over with you today. The first one is what is Roundup; right.

We all probably know that Roundup is a weed killer sold by Monsanto, but maybe we don't know what Roundup is.

Next, I'm going to talk to you about can Roundup cause cancer. Is it possible? Is it within the realm of the universe that Roundup can cause cancer? And then I'm going to talk to you about whether or not Roundup caused Mr. Hardeman's cancer, different questions.

Once I walk you down those three, I am going to sit down, and Mr. Stekloff will talk to you about Monsanto.

So Roundup. You are going to hear testimony from Mr. Hardeman, probably next week, about his Roundup use; and you are going to hear that Mr. Hardeman started spraying Roundup in 1986. You are going to hear he sprayed Roundup through and including 2011, 2012, somewhere around that time. You are going to hear that he used two products -- two main products over the course of that 26, 27 years. You are going to hear that he used Roundup Concentrate and Roundup Concentrate Plus.

You are going to hear him testify about how he has really only lived in two houses during that period of time, and he is a creature of habit; and he would go to the same stores and buy the product. It was called Yard Bird at the time -- he was living just north of Santa Rosa -- and you are going to hear him talk about how he bought these products because they came in a concentrate form so he thought it would last longer. You

are going to hear him describe how he had a two-gallon pump and how he would put concentrate in the pump, dilute it with water, and then walk around and spray. He is going to testify to you and tell you-all about his exposure activities.

So what is Roundup? Roundup is actually not that complicated of a product. This is maybe a new word for you guys, but you are going to hear it a lot over the next month: Glyphosate.

There's four main ingredients in Roundup, and you are going to hear testimony about this. Glyphosate is the active ingredient. It is what actually goes in and kills the weed. There is no dispute about that glyphosate is the active ingredient in Roundup. And you are going to hear testimony that the other ingredients -- they have a surfactant, all right, and they have a surfactant in there which actually you will hear testimony helps sort of reduce the surface tension of the glyphosate and sort of adhere it to the plant.

So if you can picture taking a glass of water, we will just say, and pouring it on a plant, it will all just fall off; right? You will hear testimony that the surfactant actually helps bind the glyphosate to the plant.

And then you are going to hear testimony that water is in Roundup, and then you are going to hear testimony that there are other contaminants, other sort of byproducts in Roundup. So those four main ingredients.

And I showed you a picture how there are two different products Mr. Hardeman used, and those four main ingredients, the ratios that -- the ratios of those ingredients are what makes the different products different. One may have more water; one may have more glyphosate. You get the picture.

So the important takeaway and the first piece of this puzzle that we need -- and the first piece of information that you guys need to understand is that glyphosate and Roundup are not the same.

You are going to hear testimony that the combination of glyphosate, with all of those other ingredients, the surfactant is actually more toxic than glyphosate alone. You are going to hear testimony to that effect. You are going to hear evidence to that effect.

So you need to remember that when people are talking about glyphosate, they are not necessarily talking about Roundup. So the first piece is to remember and put those two pieces together. That is the first piece of the puzzle, scientific puzzle. Now -- we have talked about what is Roundup.

Now I want to talk about can Roundup cause cancer. Now, this discussion is going to walk us through three main pillars of science. There is three main things that you need to consider as pieces to the second question. You are going to hear testimony that you can't look at these pieces in isolation. You are going to hear testimony that you can't

consider the epidemiology studies alone. You are going to hear you can't consider the animal studies alone, and you are going to hear testimony that you can't consider the cell data studies alone.

The testimony you are going to hear is going to tell you you need to look at all three of those pieces together to get a full picture of whether or not Roundup causes cancer.

I'm not going to be the one to teach you that. We are going to bring in witnesses. This is Dr. Ritz. Dr. Ritz is actually probably going to testify this afternoon. Depending on how long I take and how long Mr. Stekloff takes, Dr. Ritz, I anticipate, will either talk to you guys either right before lunch or right after lunch. And Dr. Ritz is a professor at the University of California, Los Angeles at UCLA. She is a medical doctor and a Ph.D. in epidemiology.

Dr. Ritz will explain to you what epidemiology is. It is a big word. She will tell you for the concept of studying human populations. She is going to tell you that really what epidemiology does is it looks at this group of people and compares them to that group of people to see which one has a higher risk of getting a disease. There is a lot of fancy lingo she is going to use, and she will explain it all to you. But that's basically the core, she will tell you.

We brought in a professor because we wanted her to be able to teach to you guys. She also happens to be the president of

the International Society of Environmental Epidemiology, the current president. She is going to tell you that there is a difference between environmental epidemiology and good old-fashioned epidemiology. She is going to tell you that environmental epidemiologists consider pesticides in human populations. That is what environmental epidemiologists do. She is going to tell you that.

I met with her last night, and she actually told me that she is --

THE COURT: That's -- that is not appropriate.

MS. WAGSTAFF: All right.

Next we are going to bring in Dr. Portier. Dr. Portier has his Ph.D. in biostatistics. Dr. Portier was supposed to testify live; but for reasons outside of our control, he couldn't be here. So last week my colleague flew to Melbourne, Australia and videotaped him. We thought it was that important to bring you his testimony, that you guys will see him by video probably later this week or early next week, depending on how fast we can get the video cut.

So you are going to hear from Dr. Portier, and you are going to learn that Dr. Portier was the former associate director of the National Toxicology Program. And you will hear that Dr. Portier basically has had his fingerprint on most of the policies and guidelines of the United States Toxicology Board. You are going to hear that from him. So we brought him

in. And Dr. Portier is going to testify to you-all about the animal studies. Dr. Portier is also going to testify to you-all about the cell studies, the data studies.

Next, we are going to bring in Dr. Weisenburger. Dr. Weisenburger is a clinician pathologist down in the Los Angeles area, and he works at the City of Hope, which is a world renowned cancer center. And you are going to learn that Dr. Portier (sic) has dedicated his life's work to determining the cause of people's cancer. He is a researcher. He is an author. You are going to hear from him he has published over 434 peer-reviewed -- pieces of literature. That is 434 articles where his colleagues have reviewed his work and published it, and you are going to hear from him on what he thinks is going on with this literature.

Dr. Weisenburger is also the author of some of the literature we are going to show you. So you are going to hear firsthand from one of the people who was involved in the scientific literature.

All right. So let's go back to the pillars of cancer science. Let's first talk about the epidemiology.

All right. This case is about Mr. Hardeman's cancer. Can Roundup cause cancer? The cancer we are specifically talking about in this case is non-Hodgkin's lymphoma. Now, you are going to hear testimony that cancer is actually a rare disease. You are going to hear testimony that non-Hodgkin's lymphoma is

a blood cancer. It starts in the blood and it stays in the blood. So the epidemiology we are going to consider in this case is going to relate to non-Hodgkin's lymphoma. We are going to -- there is epidemiology about probably everything you could possibly want epidemiology about, but we are going to limit it to non-Hodgkin's lymphoma and glyphosate.

So what we are going to do is Dr. Ritz and I are going to walk you through this chart in great detail, and that blank white study -- or that blank white column right there, by the time Dr. Ritz gets off the stand, we will have filled in all of those charts, and you will know a lot about each one of those studies. And what you will learn -- what I will show you, and I will just explain to you to orient you -- Dr. Ritz will explain to you where it says study in parentheses, this first one where it says *Hardell, et al.* 1999, that is the lead author of a -- of a scientific literature, of a journal article, and then the 1999 means the year that it was published. So this chart is depicting nine pieces of literature, and we will walk through each one.

And what this shows, when you are finished and what Dr. Ritz is going to explain to you, looking at this first one, the *Hardell*, you are going to see that there is an increased risk of non-Hodgkin's lymphoma after exposure to glyphosate. But there is a thing called "statistical significance," which you will learn a lot about, and it is a way of determining

whether or not the result happened by chance.

So this result wasn't statistically significant, so you will learn in the third row -- these are actually chronological. So you will see in the third row *Hardell* pops up again three years later. You will learn that the authors in *Hardell* added cases to their study. They almost did sort of a Phase Two of their study. And Dr. Ritz will tell you that that added power to the study and that took chance further out of the picture. Dr. Ritz will tell you that. And they reached statistical significance in *Hardell*. And Dr. Ritz will explain to you why the *Hardell* example is a great example of why you can't ignore cases that aren't statistically significant. Dr. Ritz will explain that to you.

I'm going to go back to the *McDuffie* case that is sandwiched between the two *Hardell* cases. Dr. Ritz will explain a concept to you called dose response. Dose response is sort of what it sounds like, but Dr. Ritz will tell you that dose response means the more dose or the more exposure you have, the more risk you have.

So the *McDuffie* study was a Canadian study, and actually the *McDuffie* author looked at eight providences in Canada; gathered a lot of people and looked at dose response as part of the analysis. They also looked at never-ever analysis, which you will learn about later. But one of the things that *McDuffie* looked at was they considered, Dr. Ritz will tell you,

they considered does the risk increase with the amount of dose that you get? And they used a two-day limit. And they said if you are exposed to glyphosate more than two days a year, does your risk go up for people that are exposed to glyphosate less than two days a year? *McDuffie* found the answer to be yes, it does. So she is going to explain to you the importance of dose response.

And then next we get to *De Roos* 2003. I'm skipping back over the *Hardell*, the second piece of that block, and Dr. Ritz is going to explain to you the importance of *De Roos* 2003. What Dr. Ritz is going to tell you is you are going to learn a lot about something called confounders. And Dr. Ritz is going to explain it far better to you than me. That's why we brought in a professor from UCLA. She is going to explain to you when you need to consider confounders and when you don't. Dr. Ritz is going to tell you that.

The important thing about *De Roos* is she is going to tell you that the *De Roos* authors actually adjusted for 47 confounders, and she is going to explain to you that that makes their findings even more important. And guess what? We are also going to bring Dr. Weisenburger who was an author on *De Roos* 2003 to talk about that study as well.

Then we go down to *Eriksson*, which is the next study. *Eriksson* also did a dose response calculation. *Eriksson* looked at ten lifetime days versus less than ten lifetime days, and

Dr. Ritz is going to tell you that the *Eriksson* study also found a dose response. She is going to tell you that the *Eriksson* study found that the more you are exposed to glyphosate, Roundup -- I'm sorry, Roundup, the epidemiology studies are Roundup exposure -- so the more you are exposed to Roundup, your risk increases. That's what the *Eriksson* study found.

Then she is going to walk you through the rest of them. The *Orsi* case was a case -- and she will explain to you why that study found the results they did -- they used patients in hospitals. So their controls were already people who were sick. She will explain to you why that is important. She will explain to you the significance of the effect on the study.

The next one is the *North American Pooled Project*, which Dr. Weisenburger is also an author on. Dr. Weisenburger will talk to you about that study as well. You can see in the parentheses that the *North American Pooled Project*, if you go to the second row, it actually just pooled two of the earlier studies, *McDuffie* and *De Roos*. So what that study did was it combined those two findings. She will explain to you what that means.

Then finally the last two studies are a part of what is called *The Agricultural Health Study*. We are going to spend a lot of time with Dr. Ritz talking about *The Agricultural Health Study*. What you need to know is that *The Agricultural Health*

Study, what Dr. Ritz will tell you, began in the 1970s, 1980s, and it really started getting going in the 1990s. And she is going to talk to you about that, a study -- it studied I think 50 pesticides. And they enrolled people in 1993. And she was actually an external adviser for the -- what we call the AHS, she was actually an external adviser for the AHS.

Over the years different people have published literature from collecting data from that study. So you have this study going on, and Dr. Ritz is going to tell you over the time people have pulled out literature. What you see here is *De Roos* in 2005 -- the same *De Roos* we were talking about before -- actually wrote a study and published a study about the data from the AHS. And then actually last year Andreotti in 2018 published some more data about the AHS.

That is sort of the scope of the epidemiology that you-all are going to learn about.

We talked a little bit about dose response, and Dr. Ritz will talk a little bit about this; that the dose makes poison; that the dose matters. Dr. Ritz is going to tell you how much exposure you have makes a difference, and she is going to tell you why.

You are going to become familiar with the forest plots -- sorry -- plot summaries. So all of those studies that I just talked to you about can be categorized into a dose response study or a never-ever study, and Dr. Ritz will tell you what

the differences are.

I will tell you very briefly what she will say. She will tell you that the dose response studies will do what we just talked about. They will consider how much exposure you have. The never-ever studies will say "Have you ever been exposed to Roundup?" The answer is yes or no. If the answer is yes, you are analyzed in this category, without any regard to whether or not you have been exposed one day or a thousand days. If you have been exposed, you are in the yes. You are in the ever category. If you haven't, you are in the never category.

And Dr. Ritz will tell you the pros and cons of both. I will be fair, there are pros and cons to both analyses, and she will tell them to you, and she will explain to you the effect that those analyses will have on the study results.

So what this is is this is a plot summary -- see that blue line right in the middle, that is one. That represents the number one. And what Dr. Ritz will show you is that everything on the right, all of the black squares on the right show a positive association between exposure to Roundup and non-Hodgkin's lymphoma.

One thing we haven't talked about yet, which Dr. Ritz will talk to you about, is meta-analysis, yet another type of epidemiology. And what meta-analysis does, as Dr. Ritz will tell you, is it takes different studies and it combines them into one. So it is an effort to make a study more powerful and

combine them into one, and Dr. Ritz will talk to you about those.

So here are some of the ones that we talked about earlier. Those ones with the red squares around them are the ones that actually have statistical significance.

We have talked about the *McDuffie* dose response and how they have looked at over two days, and they found there was a 212 percent increased risk if you were exposed to Roundup over two days a year. This was in 2001.

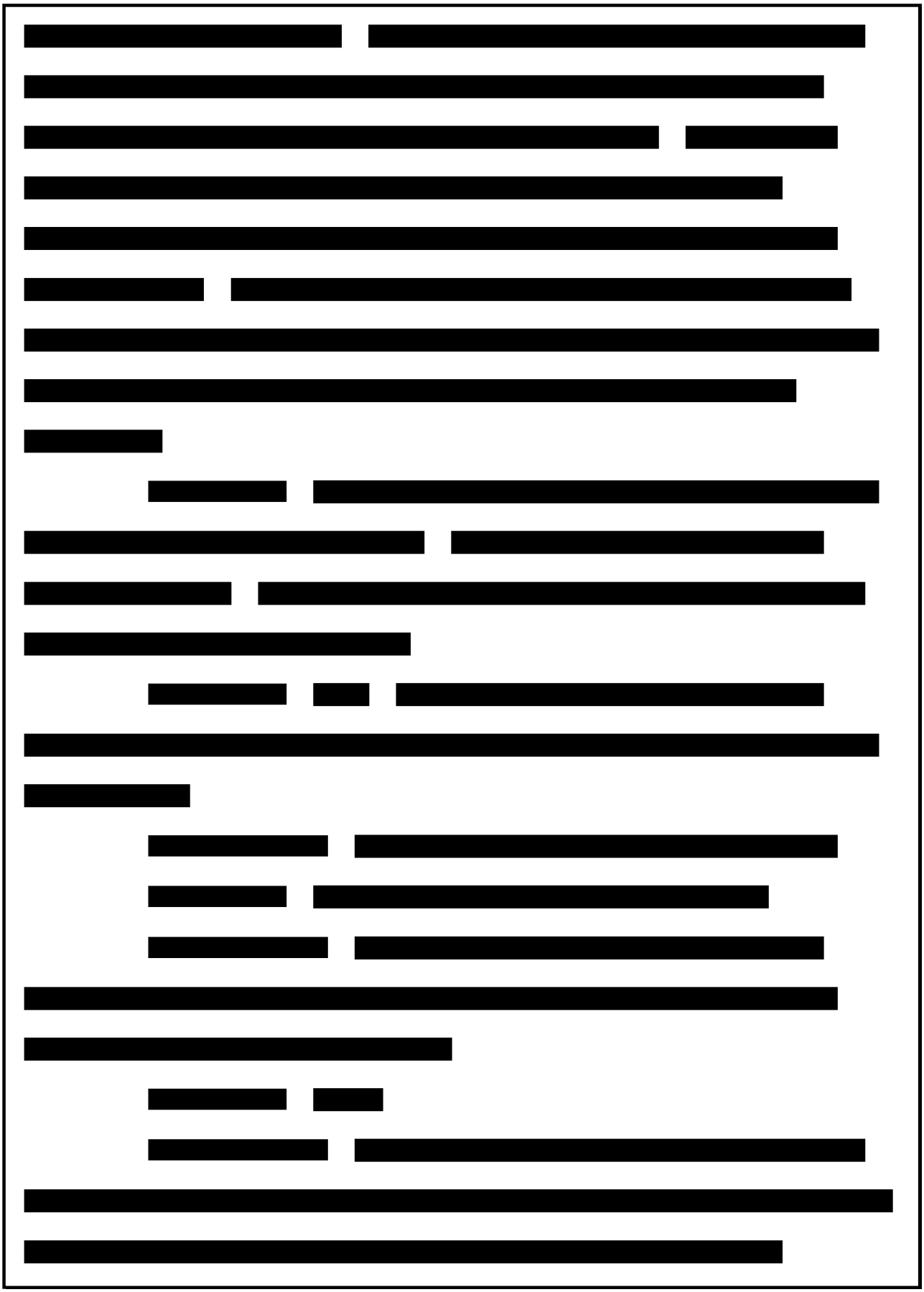
In 2008 *Eriksson* came out. They found that if you are exposed to Roundup more than ten days, you have a 202 percent chance -- I'm sorry -- you have a 236 percent chance if you are exposed to more than ten days in your life. 236 percent chance.

THE COURT: Can we have another sidebar, please?

(The following proceedings were heard at the sidebar:)

[redacted]

SIDEBAR



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(The following proceedings were heard in open court:)

THE COURT: I was going to remind the jury, there is an instruction I will give you a number of times during this trial. I actually already gave it to you on Friday -- or on Wednesday, which is the instruction about what is evidence and what is not evidence. Lawyer argument is not evidence. What the lawyers say during opening statements and closing arguments and when they are asking questions of witnesses, that is not evidence. The purpose of opening statements is solely to give a preview of what the evidence will show and the purpose of closing arguments is to argue about what the evidence shows.

And you should keep in mind the very limited role of the lawyers in this process as we go forward and to remember that what a lawyer says during opening statements does not

constitute evidence in the case.

MS. WAGSTAFF: All right. Sorry for that interruption.

We had talked a little bit about *The Agricultural Health Study*, and Dr. Ritz will probably touch on this tomorrow at some point. What Dr. Ritz is going to tell you is that this was a cohort study, which means that they gathered a lot of people -- I believe the number was around 50,000, 56,000 people that they gathered -- and she will tell you that these people were in North Carolina and Iowa, and that the study found no association for general non-Hodgkin's lymphoma.

And as we just discussed, she is going to tell you that there is two relevant papers that have come out from *The Agricultural Health Study* -- *De Roos*, 2005, which is not to be confused with *De Roos* 2003; it is kind of confusing because it is the same person -- and Andreotti 2018.

And Dr. Ritz is going to talk to you about this study. She is going to tell you that this study, while good intentioned, has some general flaws to the entire study and then she is going to tell you some specific flaws that are specifically related to glyphosate.

She is going to tell you that this study looked at 50 chemicals and that they put quantity over quality. She is going to tell you that it is almost as if they were trying to do too much.

She is going to explain that in the middle of their enrollment process, which was 1993 to 1997, she is going to explain that there was a spike in the use of Roundup. She is going to show you evidence that shows that. You will see for yourself. And she is going to show you that the way that they classified people in the beginning of the enrollment in 1993 and 1994 became an improper classification because of the glyphosate spike. She is going to explain all of this to you. And that when they went back to try to call the people, 37 percent of the people disappeared. She is going to explain all of this to you.

She is going to explain that the 37 percent of people who disappeared, they used a technique called imputation, which means they used guesses and they looked at the people who did respond; and they imputed data to the people who didn't respond. And she will testify that that is actually not a bad method. She will testify that imputation actually sometimes is okay, but what she is also going to tell you is that it is not okay when you have this many people, 37 percent of 50,000; and it is also not okay when it is layered on top of an exposure misclassification due to the glyphosate spike.

So we are going to talk about these results this afternoon or tomorrow morning with Dr. Ritz. And the last thing she will tell you -- maybe not the last thing she will tell you -- but at some point she will tell you that the test results within

the AHS studies actually suggest that Roundup protects people from cancer. And that if taken on their face, she will tell you the significance, to her what that means.

A couple of weeks ago -- today is the 25th, so 20 days ago -- a new article came out. This is one of those meta-analyses that I was telling you about. And this meta-analysis is sort of a unique thing, and Dr. Ritz will explain it to you far better than I will, but this was a meta-analysis that looked at the high dose glyphosate users. So it is kind of, she will tell you, the first time someone has taken all of those high-use people and put them in the same study. Dr. Ritz will talk to you about this study.

This was three weeks old and what these people found -- and they looked, as you will see in accordance with evidence from the experimental animal and mechanistic studies -- and mechanistic studies is what I'm calling cell data studies. So mechanistic and cell data are the same concept. So in accordance with the experimental animal and mechanistic study, our current meta-analysis of human epidemiological studies suggests a compelling link between exposure to glyphosate-based herbicides and an increased risk for NHL. And she will tell you, and I think it is pretty undisputed, that Roundup is a glyphosate-based herbicide.

So that's our second piece of the puzzle is the epidemiology. Epidemiology, sometimes I get tied up in my

tongue, so I call it epi. Epi is sort of the slang term. Epi right here is the epidemiology. It is another piece of the puzzle that we have to look at.

And so let's consider what happens before we even get to the human studies -- before we even look at what happens in human populations, let's look at the animal studies.

We have just walked you through the epidemiology and now we are going to look at toxicology, rodent studies. In rodent studies they usually test with mice and with rats, and there are particular strains of both mice and rats that are used and have been determined to be best to be used for animal testing. And we are going to have Dr. Portier talk to you about the animal testing. And what Dr. Portier will tell you is that we used this information to determine if it is biologically plausible to cause tumor in mammals, in these rats and mice.

So we are using these studies, and we are -- we are putting glyphosate in these animals to see if it causes tumors and is it possible; and he will testify to you the significance of finding tumors in animals and how that applies to humans. He will explain that to you.

So I'm going to walk you through how the basic animal study works. So usually you have groups of mice -- and it is the same for mice and rats. There is no real distinction. So we will say there are usually 50 -- there are 50 male mice and 50 female mice, and they are put into four categories. So you

usually have 400 mice in a study. And you give -- on the left you have your control groups. All right. Just to be clear, all of these toxicology -- toxicology means animal studies. They are sort of used interchangeably. So all of these animal studies involve glyphosate, the active ingredient except for one, the *George* study. We will talk about that one separately.

So you have the control group, and so you have the control group who is fed no glyphosate. The other three groups are fed glyphosate. Dr. Portier is going to tell you that the high dose is given the maximum -- maximum-tolerated dose, the MTD, and he is going to tell you how important it is to give these animals the maximum-tolerated dose. And he is going to tell you there is a specific reason, and he is going to give you that reason when he testifies.

And he is going to tell you how you determine the maximum-tolerated dose, and he is going to tell you the effect on the study if the highest group does not reach MTD. He is going to tell you-all of that. It is a high dose.

And then the low dose and the median dose are given a percentage of the maximum-tolerated dose. So on the left you have no glyphosate. On the right you have got the maximum-tolerated dose. And then you have got fractions of that.

So the mice are looked and checked for tumors at six weeks old, and Dr. Portier is going to tell you that the lifespan of

the rat and a mouse is two years equivalent to our life. So when you have a two-year-old mouse or rat, he is going to equate that to someone in their 60s, 70 years old. That is why they use rats and mice.

Dr. Portier is going to tell you that a two-year rat or mouse study is considered a long-term study. So at the end of two years, they check for tumors in these animals, and they circle -- this is just sort of a demonstrative, but they will count the tumors; right? So here it looks like there are four on the high dose; three in the medium dose; two in the low dose, and one in the control. They will count the tumor in all of those groups. And then they will chart them, and they will see if there is a dose response. They will see if -- if the people who get more glyphosate, there are more tumors, and they will draw conclusions from that; and Dr. Portier will tell you what conclusions are drawn from that.

Dr. Portier will tell you that the important thing about animal studies to look for is if there is a significant increase in tumors. He will tell you if there is a lot more tumors in the high dose, in the controlled dose, or the low dose, that is important. And he will tell you why that is important, and he will tell you what that means.

He will also tell you that replication is important. That if the same tumor is found in different studies conducted in different laboratories between two strains of mice, between

different sexes, male and female, or between a mouse and a rat, that if you see the same tumor popping up, that's really important. He will explain that to you.

Dose response, I just showed you a graphic on that. Dr. Portier will explain that if that arrow shows a dose response, that is important and he will explain the significance of that.

I mentioned across species. If you see a rare tumor in a mouse and in a rat, that's important. Dr. Portier will tell you that finding rare tumors at all is important.

So let's look at actually the studies involved in this case. The studies involved in this case -- let me orient you a little bit about this chart, and Dr. Portier will do the same -- but if you look across the top row, there is five columns, okay. And each column -- the first one says *Knezevich & Hogan* 1983. The second one says *Atkinson* 1993, following across to the right. Those are animal studies. Those are separate animal studies. And if you follow the column down, it will tell you the tumors that those authors found in the studies, and Dr. Portier will explain to you the significance of that.

So, for example, in *Knezevich & Hogan*, which was done in 1983, Dr. Portier will tell you that the authors found a kidney carcinoma or adenoma and a spleen composite lymphosarcoma. He will explain to you what those are and what that means, and he

will explain to you why it is important and why it is significant to him in his opinion that kidney sarcomas or adenomas are found in three different studies.

He will explain to you that the first four studies are CD1 mice. And the last study, the *Kumar* study is a Swiss albino mouse. Different strains. And he will explain to you why that is important. He will tell you that Monsanto conducted the first study, and other companies conducted the last four studies; and he will explain to you why that is important in his opinion.

He will explain to you the importance that a lymphoma is found in every mouse study. He will explain to you that a spleen -- I can't believe I have to say this word twice to you guys -- composite lymphosarcoma is actually a lymphoma, and he will explain to you that means there is a lymphoma finding in every mouse study.

I want to tell you a little story about the *Knezevich & Hogan*. *Knezevich & Hogan* story in 1983. *Knezevich & Hogan* in 1983 found a kidney carcinoma or adenoma.

A couple of weeks ago -- actually on January 23rd, so almost one month ago, we deposed Monsanto. They produced Dr. Reeves to talk about this study.

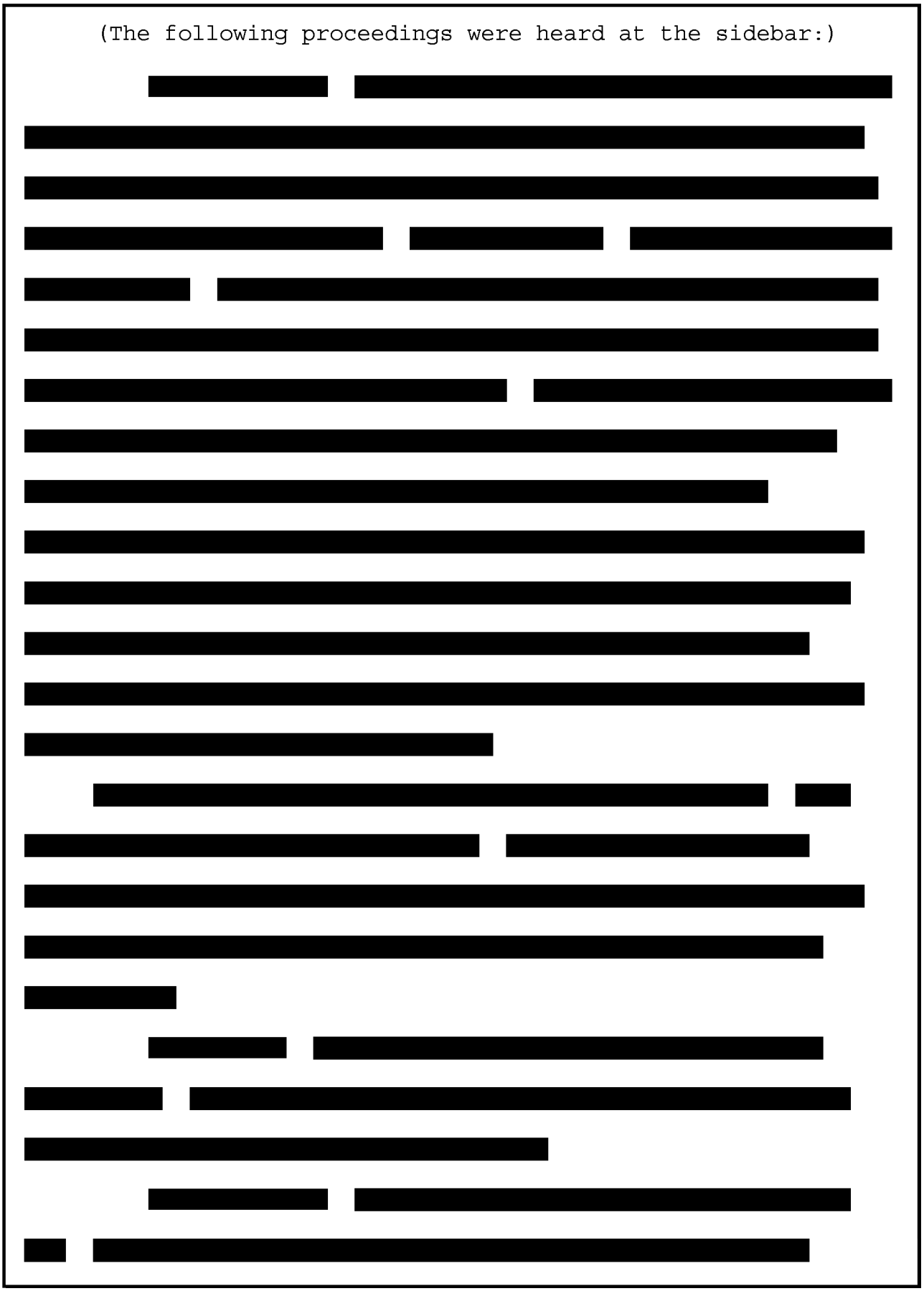
THE COURT: Hold on.

MR. STEKLOFF: May we approach?

THE COURT: Okay.

SIDEBAR

(The following proceedings were heard at the sidebar:)



[redacted]

(The following proceedings were heard in open court:)

MS. WAGSTAFF: All right. Back to where we were.

So I want to talk to you about the *Knezevich & Hogan* studies and findings that were made in 1993. I have circled this particular tumor because I want to talk and tell you a story about this particular tumor.

In 1985 Monsanto submitted the *Knezevich & Hogan* study to the EPA as support to get glyphosate approved, and the study showed that there was a 0-0-1-3 tumor finding. What that means is zero in the control group, zero in the low group. They

found one tumor in the median group and three tumors in the high group. That's how -- that's what those numbers mean, 0-0-1-3.

And around that time you will hear testimony, and you will see documents that show, that the EPA made a unanimous decision in 1985 to classify glyphosate as a Category 3 oncogene. You will hear testimony and you will see documents that Monsanto thought this was a bad thing for glyphosate.

And Monsanto, you will see testimony where they say, short of a new study or finding tumors in control groups, what can we do to get this thing off Category 3.

MR. STEKLOFF: Objection, under --

THE COURT: Overruled.

MS. WAGSTAFF: Monsanto said short of a new study or finding tumors in the control group, what can we do to get this thing off Category C; this thing called glyphosate.

The EPA responds to them: A prudent person would reject the Monsanto assumption that glyphosate dosing has no effect on kidney tumor production.

Another way of saying this is that if glyphosate were truly unrelated to kidney production, we would expect to see four or more tumors in less than one out of a hundred experiments of the type sponsored by Monsanto. Thus, glyphosate is suspect.

EPA further said, We disagree with the registrants

position -- the registrant being Monsanto. The EPA says: We disagree with Monsanto's position. The registrant wishes to avoid false positives while those concerned with the public health wish to avoid false negatives. Hence, for this reason alone, Monsanto's argument is unacceptable. Viewpoint is a key issue. Our viewpoint is one of protecting the public health when we see suspicious data. It is not our job to protect registrants from false positives. We sympathize with the registrant's problem, but they will have to demonstrate that this positive result is false.

So the EPA tells Monsanto they will have to demonstrate that the 0-0-1-3 is false. It is actually not related to the glyphosate. So you will hear testimony from Mr. Reeves -- Dr. Reeves -- I'm sorry. You will hear testimony to prove it wasn't false -- or to prove it was false they hired Dr. Kuschner.

You will see that Monsanto says, Senior management at EPA is reviewing a proposal to classify glyphosate as a Class 3 possible human carcinogen because of kidney adenomas in male mice. Remember, I circled that, kidney adenoma.

Dr. Marvin Kuschner will review the kidney sections and present his evaluation of them to EPA in an effort to persuade the agency that the observed tumors are not related to glyphosate.

So you will see Monsanto hired Dr. Kuschner to persuade

the agency that the tumors were not related to glyphosate on April 3rd, 1985. You will see documents saying that. The problem is you will also see documents that Dr. Kuschner didn't receive the slides until 11 days later, April 14th.

The story goes on and Dr. Reeves will tell you that Dr. Kuschner reviewed the slides and actually found a tumor in the control group. And you will hear testimony that Monsanto submitted Dr. Kuschner's study, the EPA, and the EPA declined the results. The EPA said that is not good enough.

You will hear testimony that the EPA then created a group of pathologists and they re-cut the slides so they actually went back to the animal, and you will hear testimony that they re-cut the slides. And the independent EPA people didn't find a tumor in the control group when they re-cut the slides.

So you will hear testimony that the EPA in 1985 then goes back to Monsanto and says, Redo the study. Redo the study.

Monsanto refuses to redo the study, and you will hear testimony about their language and how opposed they are to the study. You can decide for yourself why you think Monsanto didn't redo the study, but the important thing when you are thinking about why Monsanto didn't redo the study is Dr. Portier will show you -- remember I told you *Knezevich & Hogan* was the only study done by Monsanto -- the four tumor studies, the four studies -- mice studies that followed, the only four that have happened since then, found a lymphoma. So

you can decide when you hear the evidence why Monsanto didn't redo that study.

You will hear testimony by Mr. Hardeman that right around this time he began spraying Roundup.

Next we are going to talk about the *George* study. The *George* is slightly different. It is still a mouse study, but it has a little twist; and the twist is this -- and you will hear testimony from Dr. Portier that the *George* study is different for two main reasons.

The first reason is that it used Roundup, not glyphosate. So remember I told you one study used Roundup. Dr. Portier will tell you that the *George* study done in 2010 used Roundup. The other studies we have been talking about, you will hear testimony that they fed the glyphosate to those animals.

In the *George* study they actually shaved the mice and they rubbed Roundup on their body, and you will hear Dr. Portier tell you why that is important and the significance of that -- of rubbing the Roundup on someone's body.

You will hear Dr. Portier tell you that 40 percent of the mice that had Roundup rubbed on their skin got tumors. Zero in the control group got tumors. You will hear Dr. Portier tell you that. The study was -- did an additional step that the other mice studies didn't do, and Dr. Portier will explain it to you.

Dr. Portier will explain to you the concept of being an

initiator or a promoter. And so this study looked at whether Roundup was a promoter. And Dr. Portier will tell you what that means. What he will tell you is that some chemicals can initiate the cancer process, and some chemicals can promote the cancer process that is already going on. And so Dr. Portier will explain to you how both of those relate to the *George* study, and Dr. Portier will tell you that the *George* study is evidence that Roundup -- I have glyphosate on here, but it is actually Roundup -- is both an initiator and a promoter. And Dr. Portier will explain to you why that is important.

Next, we have the rat studies. So there is a little bit more robust group of rat studies, and it is organized the same way. *Lankas* is the first study and then *Stout and Ruecker* in 1990. What is important here is that Monsanto conducted -- you will hear testimony from Dr. Portier. Monsanto conducted the first two studies, the *Lankas* study and the *Stout and Ruecker* study, and other people conducted the other studies. The first studies are Sprague Dawley rats. The last three are Wistar rats. The only thing that is important about that is two strains of rats were used, and Dr. Portier will explain the significance of that.

I should go back. Dr. Portier will tell you that this *Suresh* study from 1996; that there was a 40-some percentage of tumors found in the control group when the -- historically those control groups of Wistar rats usually had around a

3 percent. So Dr. Portier will explain to you that -- that the control group in that study was possibly contaminated and so the results of that study can't really be useful. Dr. Portier will tell you that, but he wanted to put that in.

And Dr. Portier will use these slides, these tumor charts. So Dr. Portier will tell you that here is this kidney carcinoma or adenoma that we saw in the mice study. He will tell you that is actually a really rare tumor. He will tell you that this is really important and significant when you see it in rats and you see it in mice.

We have replication across strains here. The first ones to the left are Sprague Dawley, and then the wood one is a Wistar rat.

So Dr. Portier will tell you that we have checked off all of the animal study boxes, and that's the animal studies. Dr. Portier will tell you that there is significant evidence to conclude that exposure to glyphosate causes tumors in animals, and there is significant data to conclude that Roundup on your skin is a cancer promoter. So that's the animal piece of the puzzle.

We have one more piece of the puzzle we need to look at, and that is the cellular data. The cellular data really gets at the heart of how does this happen, how is it possible that this actually causes damage. That is what the cellular data looks at. And Dr. Portier is actually going to be the expert

who talks to you about that as well. And Dr. Portier is going to tell you that there are ten, I think -- maybe 11 -- different possible ways that something can cause damage in a cell, and he is going to tell you that two of those ways keep showing up in the literature.

Dr. Portier is going to tell you that with exposure to both Roundup and glyphosate evidence of genotoxicity and oxidative stress keep showing up.

So we talked earlier that the epidemiology is Roundup exposure; right? We talked earlier that the animal studies is pretty much glyphosate exposure, except for the *George* study, which is Roundup. And here in the cellular data you are going to learn that there actually is both. We have cellular data that relates to glyphosate, and we have cellular data that relates to Roundup.

Dr. Portier will tell you that the field -- the body of the cellular data is huge, and he will tell you that it includes data related to humans. He will tell you that it relates to data related to mammals, like monkeys; and he will tell you that it relates -- there is data as it relates to non-mammals, living things, bacteria, fish. And each of those three categories, there is cellular data with the effect of glyphosate and/or Roundup and its effect on cells both in vitro, which means in sort of a petri dish, and in vivo. So there is a whole bunch of different combinations available

Dr. Portier will tell you from the cellular data.

And Dr. Portier, in a way far better than me, will walk you through how a normal cell turns to cancer, and he will tell you that the important thing is that somewhere along the way, DNA damage or cell damage happens. And he will show you that a chemical exposure -- there are several different ways along that pathway that the damage can happen.

Dr. Portier will explain to you where the genotoxicity can happen, where the oxidative stress can happen. This is the -- this is what I just explained to you, that there are -- there is a robust body of cellular data study. And if you look at this DNA that we all learned about when we were young kids, there is different ways that the DNA can be damaged.

Dr. Portier will tell you about a single strand break. He will tell you that the DNA can get mismatched; that the base can be damaged. He will tell you that you can have a double strand break. He will talk about intrastrand cross-links and interstrand cross-links. Dr. Portier will walk you through all the ways in which exposure to Roundup or exposure to glyphosate has been studied, and he will give you his opinion on whether or not it is genotoxic.

Now, Dr. Portier will walk pretty quickly -- he actually -- his testimony is sort of weird. His testimony was actually taken last week in Australia, so I actually know what he is going to say. He is going to walk through this chart

and, he is going to put pluses or minuses where he thinks there has been genotoxicity found, where he thinks in these studies in his opinion he is going to explain to you where those studies show that exposure to Roundup and/or glyphosate has a genotoxic effect.

And then he is going to talk about the recent studies. These are the studies that have happened in the last two years. Dr. Portier will walk you through all of those.

And because it is so robust, we have asked Dr. Portier to focus on the human data. Remember I mentioned there are all these bacterial and non-human mammal data and all of that? He has pretty much focused his opinion on the human data.

So this slide is the oxidative stress data. He is going to walk you through all of that. What I have done is I have summarized it, and you will see pluses where Dr. Portier will tell you that there is a positive association.

So I have walked you through all of the three pillars of cancer science. And your question, remember, we told you, was, is: Does exposure to Roundup cause cancer. I have walked you through what you are going to hear about the epidemiology, and I have walked you through what you are going to hear about the animal studies; and I have walked you through what you are going to hear about the cellular studies, and you are going to remember that Roundup and glyphosate are not the same things. And that is the final piece of your puzzle to decide whether

exposure to Roundup causes cancer.

There is one other thing I want to tell you about before we get to whether or not exposure to Roundup caused Mr. Hardeman's cancer. There is this entity called the International Agency Research on Cancer, which we lovingly refer to as IARC. IARC is a -- an arm of the World Health Organization.

And you are going to hear that Dr. Portier actually has experience with IARC. Dr. Ritz has experience with IARC. And what you are going to hear is you are going to hear that in 2014 and into the beginning of 2015 IARC reviewed glyphosate. What IARC did was they brought 17 people from around the whole world, not just Americans, people from all over the world, and they convened in Leon, France. And prior to showing up, you will hear testimony that they spent about six months or so reviewing the literature, and these aren't people who -- let me move back.

These are people who are invited there because they are experts in their field. So you have them reviewing the literature, leading experts on cancer, and they went to Leon, France in March of 2015, so almost four years ago. People from the EPA were there. There was someone there from the California EPA. Monsanto actually sent an observer. You will hear evidence that actually Monsanto participated a little bit in the process.

They had a week-long meeting in France. And they weren't just looking at glyphosate; they were looking at a couple other chemicals as well, and they categorized the evidence in similar buckets than we did. They didn't have all the data that our experts have here. They had a limitation of using peer-reviewed literature that our experts don't have, but they considered the evidence as well.

They actually had a fourth group called exposure, but I don't think -- anyway, so epidemiology, IARC determined was limited. And IARC is an international entity that doesn't sometimes use the same language that you or I would use when we are talking to people or that you or I would sort of give significance to. So I wanted to read to you what IARC's definition of "limited" is.

According to IARC, limited evidence means that a positive association --

THE COURT: Ms. Wagstaff, you are getting into more detail on what the IARC investigated than you are going to be allowed to present at Phase One, so I will ask you to move on.

MS. WAGSTAFF: Okay. Thank you, Your Honor.

So what the IARC concluded was they unanimously decided to list glyphosate as a Class 2 carcinogen, which means that they unanimously decided after looking at the literature that it was a probable human carcinogen.

So one month ago, we deposed Dr. Reeves who was a Monsanto

representative, and Monsanto told us that there is no evidence that glyphosate or glyphosate-based formulations caused cancer. That is what Monsanto told us a month ago, and that's why we are here today.

So I want to talk to you a little bit about the EPA, just touch on it briefly. The EPA does not look at Roundup. You're going to hear testimony that the EPA only looks at glyphosate.

You're going to hear testimony that the EPA actually doesn't test anything --

MR. STEKLOFF: Objection, Your Honor.

THE COURT: Sustained. Why don't you move on from the EPA.

MS. WAGSTAFF: All right.

So can Roundup cause cancer? So let's look at whether or not Mr. Hardeman's exposure to Roundup caused his cancer.

You're going to hear from three of Mr. Hardeman's --

THE COURT: I wonder if -- since you're changing topics, I wonder if this is a good time to take a brief morning break. It's five minutes to 10:00. Why don't we resume at five minutes after 10:00. We'll take a morning break.

(Proceedings were heard out of the presence of the jury:)

THE COURT: Okay. Ms. Wagstaff, you have crossed the line so many times in your opening statement, it's obvious that it's deliberate. The last time -- the most recent time was when you were talking about the EPA and you were referring to

the EPA being vulnerable to political pressure. Totally inappropriate. Totally inconsistent with everything we've discussed over the past several months.

So I'm going to give you one final warning. One final warning. If you cross the line one more time in your opening statement with respect to Phase I, if you bring in material during your opening statement that is inadmissible during Phase I, your opening statement will be over. I will tell you to sit down and I will tell you that your opening statement is over, and I will do it in front of the jury.

Do you understand?

MS. WAGSTAFF: Yes, Your Honor.

THE COURT: Okay. Last chance. Last warning.

(Recess taken at 10:00 a.m.)

(Proceedings resumed at 10:10 a.m.)

(Proceedings were heard out of the presence of the jury:)

THE COURT: Okay. Very briefly, I have just filed an order. It's an Order to Show Cause why Ms. Wagstaff should not be sanctioned for deliberately crossing the line during her opening statement a number of times.

That deliberate crossing of the line is not only reflected in what Ms. Wagstaff said but in the slides that she and her team prepared for the opening statement.

So Ms. Wagstaff will be required to respond in writing by 8:00 p.m. tonight why she should not be sanctioned for crossing

the line and will have a further opportunity to be heard on it after that.

For now, I guess my question is: Should I ban the plaintiffs from using their slides for the remainder of the opening statement given what we've seen so far? I've already warned Ms. Wagstaff that if she crosses the line one more time, she will be required to sit down and her opening statement will be over.

The question is: Should I save Ms. Wagstaff from herself by barring her from the further use of slides during her opening statement, which I suspect contain a number of inappropriate things? Thoughts?

MR. STEKLOFF: Yes, Your Honor, I have two thoughts. First, we would ask that you preclude Ms. Wagstaff from using slides in the rest of her presentation given what we've seen.

I would also ask for a curative instruction specifically on the issue of the Knezevich study. And what I would like to raise there is two issues.

First, Your Honor required us to submit the exhibits that we would be referencing in opening and both parties e-mailed chambers with our exhibits. None of the exhibits about that study were contained in plaintiff's e-mail to the Court. So we had no notice and Your Honor had no notice, and I think the exact purpose of that was so that any issues could be raised ahead of time rather than in the middle of opening.

Second --

THE COURT: I understand your request. I'm not going to give an instruction specifically about that, but I will give a more specific curative instruction that a number of statements that Ms. Wagstaff has made will not be coming into evidence and the Court should -- and the jury should disregard it.

MR. STEKLOFF: Thank you, Your Honor.

MS. WAGSTAFF: And, Your Honor, if I may, because I seem to have got you quite upset.

I have listened to Dr. Portier's testimony.

THE COURT: It's not about being upset. It's about running an orderly trial.

MS. WAGSTAFF: I --

THE COURT: And, as I said, you've completely disregarded the limitations that were set upon you.

MS. WAGSTAFF: I understand that, and I would just like an opportunity to say something if you would please indulge me.

THE COURT: Only if it relates to how your opening statement is going to go.

MS. WAGSTAFF: It does relate to my opening statement.

THE COURT: Okay. Go ahead.

MS. WAGSTAFF: Thank you.

Dr. Portier was asked questions that specifically said

"Obama's EPA." That's the way the questions were phrased.

THE COURT: Okay. Is this about your opening statement going forward or what has already happened?

MS. WAGSTAFF: What has already happened.

THE COURT: Okay. We'll talk about what's already happened later.

MS. WAGSTAFF: All right.

THE COURT: You'll have an opportunity to be heard about that.

MS. WAGSTAFF: Okay. Thank you.

THE COURT: Okay.

MS. WAGSTAFF: I think I can use my slides --

THE COURT: Okay.

MS. WAGSTAFF: -- and listen to your advice.

THE COURT: It's your risk.

MS. WAGSTAFF: I understand.

THE COURT: You're the one bearing the risk.

MS. WAGSTAFF: I understand, Your Honor.

THE COURT: If I see a single inappropriate thing on those slides, I'm shutting you down --

MS. WAGSTAFF: Okay. Thank you, Your Honor.

THE COURT: -- and your opening statement is done.

Okay. Bring in the jury.

(Proceedings were heard in the presence of the jury:)

THE COURT: Okay. Welcome back.

Ladies and gentlemen of the jury, let me remind you once again of my instruction that statements by lawyers are not evidence. Sometimes, as has occurred today, lawyers will make statements about things that are not -- will not actually come into evidence, and so it's important that you take with a grain of salt what both lawyers on both sides tell you during opening statement about what the evidence will show.

What matters is the evidence that actually comes in in the courtroom, not what the lawyers tell you it will be.

So with that, Ms. Wagstaff, you can resume.

MS. WAGSTAFF: Thank you, Your Honor.

All right. Now we are to the point in my opening statement where we talk about whether or not Mr. Hardeman's Roundup exposure caused his cancer.

And so you will hear testimony from three of Mr. Hardeman's treating physicians. These are three Kaiser doctors who work up in the Santa Rosa area, and you will hear testimony from them by videotape deposition that occurred last year, and you will hear testimony related to his diagnosis of non-Hodgkin's lymphoma.

Next you will hear from Mr. Hardeman himself about his exposure to Roundup. He will walk you through his 26 years of Roundup exposure, and he will tell you how often he sprayed, how much he sprayed, what he wore when he sprayed, and he will explain to you his exposure.

Now, what this is here, Mr. Hardeman will tell you that he started spraying Roundup around 1986; and that he lived in a town with Mary called Gualala, and they lived there for a few years and that's where he began spraying Roundup. He'll testify to that.

Around 1988, you'll hear from Mr. Hardeman that he and Mary bought this property. And this is a plot map, and this is a plot map in yellow of his property. And Mr. Hardeman will testify to his spraying habits on this property. It's a 56-acre property where he lived from roughly 1988 to roughly 2012.

And you'll see these blue dots that will become more apparent when Mr. Hardeman testifies and this yellow sort of dash. And he'll explain where his house was on this property and he'll explain where the hiking trails were.

And he'll explain where exactly on the property he sprayed. And he'll explain to you that there was a serious problem with poison oak on his property. He'll even tell you that there were poison oak festivals in the Santa Rosa community during the '80s and '90s because the poison oak was so bad. And, in fact, he'll tell you that he had to go to the doctor's office sometimes because his poison oak got so bad.

Now, he's not going to come in here and tell you that he sprayed every inch of this 56-acre property, but he's going to walk you through exactly where he sprayed and when he sprayed

it, and he's going to tell you that most of his spraying was done on the hiking trails in and around his home so that he and Mary could enjoy weekend hikes.

And he'll tell you that when he bought the property, he got it for a real deal because the previous owner had not maintained the land. And he'll tell you that he didn't hire a crew to come and fix the land; that he did it himself, and it was a real source of pride for him. He'll tell you that.

And he'll tell you that when you came on the property, which is gated all the way around, that when you came on the property, he'll explain to you that there was a driveway that led up to his house. And he'll explain to you that he used to walk -- he'll explain to you that the driveway had sort of a cliff cutout almost, and that he used to walk with that 2-gallon sprayer I was telling you about before and spray the side of the cliff and spray the side of the cliff, and he'll tell you that.

And he'll tell you that sometimes around his house he used to spray poison oak that was coming off of eaves of his house, and he'll testify that sometimes he remembers feeling the Roundup on his face.

And he'll testify that in 2015 on Valentine's Day he was told that he had aggressive Stage 3 cancer.

And so a doctor is going to come in, an expert witness is going to come in, and do what's known as a differential

diagnosis for Mr. Hardeman. And so what that doctor will do, is that doctor will put all of the known risk factors for NHL in the left-hand column. This includes age, sex, and race, family history, pesticide use, obesity, viral infections, bacterial infections, and so on and so forth.

And then that doctor will sit here on this witness stand and he will walk you through every single factor, and he will tell you why he doesn't think age caused Mr. Hardeman's lymphoma. He will tell you why he doesn't think the fact that he's a man caused it, the fact that he's white. He'll tell you that there's no family history that would cause it -- cause him to have non-Hodgkin's lymphoma.

And then there are certain factors that require a little bit more attention. We'll get to those in a minute. Those are Roundup. Roundup is a pesticide. Obesity. Hepatitis C and hepatitis B, those are viral infections.

And then he'll continue going through this list, and then he will tell you that he spent more time considering the literature we've discussed today, considering Mr. Hardeman's specific use of Roundup, how much he used it, how frequently he used it, the duration of time he used it. This doctor considered all of those things.

And he also did the same with obesity. This doctor will tell you he considered Mr. Hardeman's weight. He considered Mr. Hardeman's body mass index, and he considered whether that

caused Mr. Hardeman's non-Hodgkin's lymphoma.

And the remaining two are viral infections. This doctor will tell you that Mr. Hardeman at one time had an antibody for hepatitis B. This doctor will further tell you that there's been no positive diagnosis of hepatitis B in Mr. Hardeman's medical history, but he considered hepatitis B because he had the positive antibody, which means at some point Mr. Hardeman was probably exposed to the hepatitis B virus. And he will tell you how he's able to rule out hepatitis B.

This doctor will also talk to you about hepatitis C, and Mr. Hardeman will talk to you about his hepatitis C that he had. Mr. Hardeman will tell you that he was probably exposed to hepatitis C in the late '60s. Mr. Hardeman will tell you that it was probably around 1966 that he was exposed to hepatitis C.

What the medical records and the evidence will show you and what Mr. Hardeman will tell you is that in 2005 he was diagnosed with active hepatitis C. In 2006, you will hear testimony and you will see the records that Mr. Hardeman was cured of his hepatitis C.

And you will hear from Mr. Hardeman that from 2006 through today, he's never had a positive finding of hepatitis C in his blood test, and he's had plenty of blood tests since then. Hepatitis C, they test it by something called a viral load, and you'll hear Mr. Hardeman tell you he's never had an elevated

viral load since 2006.

So you'll hear our expert tell you that his hepatitis C was cured. And, in fact, Mr. Hardeman believed it to be cured as of 2006.

You'll hear our expert tell you that if any remaining hepatitis C had lingered in his body undetected, you'll hear that it would have reared its head during chemotherapy. You'll hear testimony that the chemotherapy suppressed his immune system so bad that any lingering viral infections or virus would have shown up, and you'll see evidence and testimony that it didn't. You'll see testimony that Mr. Hardeman went through his chemotherapy in 2015, nine years after being cured of hep C, and there was no hep C incident.

And you'll hear that those are the reasons why our expert was able to conclude that Roundup was a substantial factor in causing Mr. Hardeman's hepatitis C. And you'll hear that those are the reasons that they were able to conclude that those other three were not substantial factors.

So I just wanted to include a couple of pictures that you will see related to his property. You can tell these are kind of old photos.

And so at the end of the day or at the end of the Phase I, not the end of the day, the end of Phase I, we've given you all the pieces of the puzzle that we think you need to make your decision.

You guys have paid great attention to me. I can tell that you've been paying a lot of attention for the last hour and a half, and I really thank you for that. I thank you for your attention and Mr. Hardeman thanks you for your attention. Thank you.

THE COURT: Okay. Mr. Stekloff.

MR. STEKLOFF: Thank you, Your Honor.

Can I just have a moment to move a few things around?

THE COURT: Sure.

(Pause in proceedings.)

MR. STEKLOFF: May I proceed, Your Honor?

THE COURT: You may.

OPENING STATEMENT

MR. STEKLOFF: Good morning, everyone.

ALL: Good morning.

MR. STEKLOFF: You have heard that you are here to answer this question: Did Roundup cause Mr. Hardeman's cancer, his non-Hodgkin's lymphoma? That is the question that you are being asked in this phase to answer.

And so for the next few weeks, Tamarra, Rakesh, and I, we're going to give you the evidence that you need to answer this question, the testimony that you need to hear, the exhibits that you need to see. We're not going to waste your time and we're not going to talk about other issues that don't matter to this question because this is the question that is

part of Phase I, which is what we're discussing right now.

So that's also what I'm going to talk to you about this morning, what is the evidence that you are going to hear over the next few weeks to answer this question. And the answer to this question is no, Roundup did not cause Mr. Hardeman's non-Hodgkin's lymphoma.

So where I want to start is actually there are some areas in this case that are not in dispute, things that I don't think you will hear us fighting about when you hear from the various experts that both sides are going to bring you.

The first is that non-Hodgkin's lymphoma, that's NHL, is a common cancer. That doesn't mean it's a common disease but among cancer, it is a common cancer. You're going to hear that over 70,000 people every single year just here in the United States are diagnosed with non-Hodgkin's lymphoma.

And what you're also going to hear is that for those 70,000 people per year, the cause of their non-Hodgkin's lymphoma when they go to their doctors and hospitals around the country is unknown. Doctors don't tell them and cannot tell them what caused their cancer.

You're going to hear different percentages, but I think everyone will agree, whether it's 70 percent or over 90 percent, people out in society outside of this courtroom when they are unfortunately diagnosed with non-Hodgkin's lymphoma, they don't know what caused their cancer.

And to be clear, the other percentage, the 10 to 30 percent, they're not told that Roundup or glyphosate is what caused their cancer. They're told other things caused their cancer, whether it's specific genetic issues that they had or whether it's specific viral diseases. Like, there's something called Epstein-Barr disease or hepatitis. They are told in some circumstances about those types of things that caused their cancer, but most people are not told at all and no one is told Roundup.

The other thing is that of those over 70,000 people per year who unfortunately are diagnosed with non-Hodgkin's lymphoma, most of them have never used Roundup in their entire life.

People unfortunately, like other cancers, are diagnosed with this type of cancer, non-Hodgkin's lymphoma, every single day and we don't know why. Doctors don't know why. Oncologists, which are the doctors that treat cancer; pathologists, which are the doctors that diagnose cancer when they look at a tumor on a slide, they do not know what causes cancer.

And the last thing that is not in dispute is that there is no test that a doctor can run in a hospital to tell a patient whether or not his or her cancer was caused by Roundup. There's nothing that a doctor can do to look on a microscope and look at the tumor or any other test -- MRI, CAT scan,

anything you can think of -- there is no test to say "I'm looking at this individual's cancer and I'm telling you this cancer had something to do with Roundup." It doesn't exist, and there is no dispute about that.

So what is non-Hodgkin's lymphoma? Because, again, that's the type of cancer that Mr. Hardeman was diagnosed with in 2015. It is a cancer of the immune system. So the cancer will occur at certain cells in your blood, and then it may show up in different ways. So I think you saw one of the pictures was in Mr. Hardeman's case he had a tumor on his neck, and that's what led him to go to the hospital and seek a diagnosis, and that's when they diagnosed in 2015 his non-Hodgkin's lymphoma.

I've already told you that there are 70,000 -- over 70,000, I think it's closer to 75,000, new cases per year here in the United States alone. There are also 60 different subtypes of non-Hodgkin's lymphoma. So doctors get even more specific about which type of -- whether it's a certain type of cell or other issues, which subtype of non-Hodgkin's lymphoma people have who are diagnosed with it.

And so I mentioned this thing called DLBCL. It stands for diffuse large B-cell lymphoma. That is the specific type of non-Hodgkin's lymphoma that Mr. Hardeman had, and that is the most common type of non-Hodgkin's lymphoma overall.

Now, you're going to hear from three different categories of doctors who are going to talk to you about Mr. Hardeman.

There are going to be other doctors that come in during trial. You heard a lot about Dr. Ritz and Dr. Portier, but these are the doctors who are going to talk to you specifically about Mr. Hardeman.

The plaintiffs, I believe, are going to bring two experts. They didn't say during opening, but I believe and we'll see, that they are going to bring you a Dr. Weisenburger and a Dr. Nabhan. Dr. Weisenburger is a pathologist. Dr. Nabhan is an oncologist. So he's someone who treats cancer patients. He stopped treating patients two years ago and is still practicing -- dealing with medical issues, but he is a trained oncologist.

You're also going to hear from three of Mr. Hardeman's doctors who treated him during the course of the events we're dealing with here. You're going to hear from Dr. Ye. Dr. Ye was the doctor who took care of Mr. Hardeman starting in 2015 when he was diagnosed with non-Hodgkin's lymphoma and is still taking care of him today.

You're going to hear from Dr. Turk, who's his general practitioner; and Dr. Turley, who is his, I will simplify it, ear, nose, and throat doctor, who actually took the biopsy of that tumor that we saw on Mr. Hardeman's neck and that helped diagnose his non-Hodgkin's lymphoma.

And then we also are going to bring you experts who are going to talk to you about Mr. Hardeman. We're going to bring

you Dr. Levine, who's an oncologist and a hematologist. A hematologist is a doctor who specializes in blood disorders. And then we're going to bring you Dr. Arber, who's a pathologist.

And I'll talk to you more about them later, but right now I just wanted to explain the three categories of doctors that you are going to hear from during this trial about Mr. Hardeman specifically.

And of those doctors, who tells patients outside of this courtroom that Roundup causes cancer? None of them. Not a single one. Not the plaintiff's experts, Dr. Weisenburger or Dr. Nabhan; not Mr. Hardeman's doctors; and not the experts that we will also bring. They do not tell patients outside of this courtroom that Roundup causes cancer. They've never told that to a single patient. None of them in all three categories.

So I want to talk to you a little bit more about Mr. Hardeman because, again, the question you have to answer is: Did Roundup cause Mr. Hardeman's non-Hodgkin's lymphoma?

Mr. Hardeman today, I believe, is 70 years old. I've talked to you about the fact that in 2015 he was diagnosed with non-Hodgkin's lymphoma when he was 66. And we're going to talk about these risk factors that he had for non-Hodgkin's lymphoma, and I want to explain to you what a risk factor is.

A risk factor is something that increases your chance of

developing a condition. And so all of these things -- hepatitis C, hepatitis B, the age 66 at which he was diagnosed, and his weight or his body mass index -- increase his chances of developing non-Hodgkin's lymphoma in 2015.

And then today, and this is fortunate and I think everyone will agree on this -- first of all, everyone agrees that it is tragic that he was diagnosed with non-Hodgkin's lymphoma in 2015. He has been in remission for almost a four-year period that we are at today, and it's very fortunate that it hasn't come back.

Mr. Hardeman's non-Hodgkin's lymphoma. The doctors that you are going to hear from, his cancer doctors, they don't say that Roundup causes cancer. They don't say that Roundup caused his cancer. And you will not see a reference to Roundup or that active ingredient glyphosate in a single medical record. We've had access to all of Mr. Hardeman's medical records, both sides. There's not a single reference to Roundup or glyphosate in any of his medical records.

So I want to focus for a moment on Dr. Ye because, again, Dr. Ye is the oncologist. He is the person who was responsible for taking care of Mr. Hardeman when he was diagnosed with non-Hodgkin's lymphoma in 2015. He also is an oncologist and a hematologist. So he not only treats patients for cancer, but he has a background in diseases that involve blood disorders.

He was educated and trained at excellent schools, New York

University School of Medicine.

He had a fellowship, so he had further medical education, at something called the National Institutes of Health. That's the elite governmental organization that focuses on medical issues in our country.

He treats over 50 cancer patients a week. He's treated hundreds or thousands of patients with non-Hodgkin's lymphoma, and he still treats Mr. Hardeman today. He is still his doctor today, and you will see his testimony on video and hear what he had to say about his care and treatment of Mr. Hardeman.

And I'm going to show you some of his testimony that you will see. And I want to be clear, this testimony, we go and take a deposition. It's a normal part of a legal process. There's a court reporter there and the witnesses are under oath, and you'll see several of those depositions. But his deposition took place at the end of October last year. So this is recent testimony that he gave about the questions you have to answer in this case. And he was asked (reading):

> "As part of your care and treatment of your patients, if you could determine the cause of their cancer, you would want to do so; right?"

And his answer was "Yes."

So doctors, of course, who are treating patients outside of this courtroom in the real world, if they can learn what caused a patient's cancer, they want to know because that is

going to help them with their patients. That's going to improve their ability to help their patients, and that's what Dr. Ye testified to and you will see that on his video.

We also asked him (reading):

"And you've never determined -- tried to determine whether any of them" -- that's any of his patients -- "were exposed to glyphosate; correct?"

His answer was "No, I don't."

So he doesn't even ask his patients about whether they used Roundup or whether they used any sort of glyphosate product if it was different than Roundup.

And, finally, we asked him about his medical records and we asked (reading):

"Now, we looked at a number of medical records regarding your care and treatment of Mr. Hardeman. And we can agree that nowhere did you ever write down glyphosate or Roundup in his medical records; correct?"

And his answer was "I don't believe I would have."

And that's because he never told -- he has never told Mr. Hardeman that his cancer was caused by Roundup.

Now, you heard a little bit about hepatitis C at the end there. Do you remember that list of known risk factors that we just discussed? So one of them was hepatitis C, and I want to talk to you about what hepatitis C is and then show you some of the medical records from Mr. Hardeman's medical history about

hepatitis C.

Hepatitis C is a viral infection. It can lead to liver cirrhosis. So some of you may or may not have heard of liver cirrhosis, but that's basically a scarring of your liver. And having hepatitis C alone, if you have it for long enough, if you have it for decades, it can actually lead to liver cirrhosis in your body, but you have to have it for a long time for that to happen.

It can cause genetic mutations, genetic mutations that can lead to cancer, and it is a known cause of non-Hodgkin's lymphoma.

So in 2005 you heard that Mr. Hardeman went and was diagnosed with active hepatitis C. And this is one of his medical records. This is the doctor that was treating him for that, for the hepatitis C, Dr. Ruffner-Statzer; and during that consultation, she noted that he had a history of hepatitis dating back to 1966.

MS. WAGSTAFF: Objection, Your Honor.

THE COURT: Take down the slide.

MS. WAGSTAFF: Can we take the slide down?

MR. STEKLOFF: Yes.

THE COURT: You can't use that slide.

MS. WAGSTAFF: I believe that violates --

MR. STEKLOFF: Okay.

That's not the only medical record that talks about

Mr. Hardeman's chronic hepatitis C, that he had hepatitis C for a very long period of time. And so these are other medical records that are in his file that all reference chronic hepatitis C over time.

I don't believe there will be any dispute, there shouldn't be any dispute, that Mr. Hardeman was exposed to hepatitis C in the 1960s and that he had active hepatitis C for a long period of time.

And part of the reason that we -- why we know he had hepatitis C active in his body for a long period of time is that he did, in fact, unfortunately, have cirrhosis of the liver.

So you can also see, this is one of his medical records, that he developed cirrhosis of the liver; that hepatitis C, that hepatitis C, that virus in his body, caused scarring in his liver to be diagnosed with cirrhosis.

And so we asked Dr. Weisenburger (reading):

"Is it your opinion that the cirrhosis of his liver" -- this is Mr. Hardeman's liver -- "was a result of his hepatitis C infection?"

And his answer was "Yes."

So you don't have to take it from me. You don't have to take it from the medical records. Their expert agrees that hepatitis C led to cirrhosis of the liver in Mr. Hardeman, and what that tells you is it was in his body and it was impacting

him for a long period of time.

And this is just a timeline that sort of summarizes Mr. Hardeman's hepatitis C, including his treatment for hepatitis C. So you can see he was exposed to hepatitis C in the 1960s.

You'll actually here that in 1989 there's a record where he had elevated liver enzymes, and that shows again the hepatitis C is doing something to his body. It's causing enzymes in his liver to be elevated when he tests for them.

In 2005, that's when his hepatitis C was identified by his doctors on an ultrasound. He then had treatment for his hepatitis C for about almost two years, a little less than two years, and it ended in November of 2006.

And then the hepatitis C, while it hasn't shown up on blood tests since then -- so I think we heard the word "cured." Hepatitis C is actually, you're going to hear, a little bit like chicken pox. You can have it cured but it never quite goes away. If you really, really dug, it's there. So his diagnosis of non-Hodgkin's lymphoma took place in 2015.

Now, what did plaintiff's experts -- again, these are plaintiff's experts -- say about hepatitis C as a risk factor? We asked Dr. Weisenburger (reading):

"You agree" --

THE COURT: Hold on. I don't think it's appropriate. Take down that slide.

MR. STEKLOFF: Yes, Your Honor.

THE COURT: It's not appropriate to be showing deposition testimony to the jurors that may not come in. The experts will be testifying live so what you asked them in your deposition is not relevant right now.

MR. STEKLOFF: Okay.

THE COURT: So exclude any references to prior deposition testimony by experts.

MR. STEKLOFF: Okay, Your Honor. Thank you.

You will hear, I think there will be no dispute, from their experts that hepatitis C is a risk factor for non-Hodgkin's lymphoma, and I also believe that you will hear that they will admit that hepatitis C causes genetic mutations.

So those two points should be no dispute about. Hepatitis C, especially if you have it for a long time, it's a risk factor that increases your chances for non-Hodgkin's lymphoma, and it is something that in your body causes genetic mutations.

So is hepatitis C a risk factor for Mr. Hardeman? The answer to that question is yes. Now, plaintiff's experts, when they do this differential diagnosis, they're going to say "You shouldn't pay attention to that." But it is an accepted risk factor for Mr. Hardeman for his non-Hodgkin's lymphoma.

Now, you also heard that Mr. Hardeman had hepatitis B. Hepatitis B is a different version of hepatitis, and it's

unclear exactly how long he had it. I think it will be clear that he was exposed to it again in the 1960s. Hepatitis B, your body can treat itself. You don't have to go through treatment at a hospital, but hepatitis B also is a known risk factor for non-Hodgkin's lymphoma.

I think even their experts will agree, I think when they come on the stand and they're questioned, that hepatitis B is a risk factor that in some instances can double your risk of developing non-Hodgkin's lymphoma.

So, again, it has to be something that's considered as something that increased Mr. Hardeman's chances of developing non-Hodgkin's lymphoma given that he had this condition; and we know he had this condition because his medical records talk about the fact that his body now has developed an antibody, something to protect against hepatitis B from becoming active.

So is hepatitis B a risk factor for Mr. Hardeman's non-Hodgkin's lymphoma? The answer is yes.

Now, you're also going to hear -- actually you just saw, I think, in this chart -- that the plaintiffs listed known risk factors, and two of those risk factors were age and weight or body mass index. And so you're going to hear that if you are over 60, it increases your risk of developing non-Hodgkin's lymphoma. As you get older, unfortunately you are more likely to develop this type of cancer.

You're also going to hear that if your body mass index is

higher than it should be, that that increases your chance of developing non-Hodgkin's lymphoma.

So, again, not just our experts but their experts are going to agree, first of all, that those are risk factors; and, second of all, that they were risk factors for Mr. Hardeman.

Now, again, they're going to dismiss them. They're going to tell you that you don't need to pay attention to that because at the end of the day, the only thing you should care about is Roundup.

MS. WAGSTAFF: Objection. This is getting into argument.

THE COURT: Sustained.

MR. STEKLOFF: I'll move on, but the evidence will show that hepatitis C, hepatitis B, age, and body mass index were all risk factors for Mr. Hardeman.

Now, I told you we are going to bring you two experts in this case to talk to you specifically about Mr. Hardeman and about whether or not -- and help you answer that question: Did Roundup cause Mr. Hardeman's cancer?

One of the experts we're going to bring in I mentioned is Dr. Levine. Dr. Levine previously practiced at Keck Medical Center at U.S.C. in Los Angeles, University of Southern California, and today practices at City of Hope also in Los Angeles, which I think you heard actually during plaintiff's opening, we will agree, is an elite worldwide

recognized cancer center in this country. She actually was recently, although she now has moved on, the chief medical officer at City of Hope for nine years. During that time period, she was actually Dr. Weisenburger's supervisor. He reported to her.

She has published over 325 peer-reviewed articles, including on issues relating to hepatitis C and many issues relating to non-Hodgkin's lymphoma.

Before that, she chaired the hematology practice at the University of Southern California, and she maintains a practice today treating patients with non-Hodgkin's lymphoma. For decades, she has been treating patients with non-Hodgkin's lymphoma, including today.

Dr. Arber is the chair of pathology at the University of Chicago. Before that, he was at Stanford as a pathologist. He's also authored over 300 publications, including publications on non-Hodgkin's lymphoma. He's been recognized with awards.

And what they are going to come in and tell you is that Roundup did not cause Mr. Hardeman's non-Hodgkin's lymphoma. And what Dr. Levine is going to tell you is that if she had to say what the most likely cause of Mr. Hardeman's non-Hodgkin's lymphoma was, she would say hepatitis C, she would say that hepatitis C that he was exposed to for decades that led to cirrhosis of his liver that is a known cause of non-Hodgkin's

lymphoma.

So I want to talk for a moment about Mr. Hardeman's Roundup use. You heard a little bit about it I think toward the end of the plaintiff's presentation.

He used Roundup around his home. He had, I think, two different properties where he used it. He would take the concentrate that you heard of and mix it in water, and then I think the evidence will show that he would use a handheld container, like the one that's sort of at the bottom left of this picture, and he would mostly spot spray. So he would take something that would reach out, he would look for weeds on his property that needed to be killed, and he would try to reach the spot sprayer and spray those.

And he stopped using Roundup in about -- in either late 2011 or early 2012. He's not quite sure. And that is three years or so before he developed his non-Hodgkin's lymphoma.

So you also heard a little bit about Roundup, but what does Roundup do? Roundup -- and you heard about glyphosate, which is the active ingredient -- glyphosate targets a specific enzyme in plants that is essential for their growth. So plants need to produce amino acids or proteins to grow, and glyphosate actually targets those proteins and kills them off.

But two things that Roundup does not do is it does not enter the groundwater, so water that's contained in soil, and it does not stay in soil. So you're not going to hear too much

about this, but these are some of the basic points about how Roundup works.

Glyphosate, which is, again, the active ingredient that's been in Roundup, has been studied for decades. Roundup itself has been on the market for over 40 years. There have been 800 scientific studies about Roundup. Now, to be clear, not all of those studies are dealing with cancer, but there have been 800 scientific studies overall. And over 70,000 people have been studied to have been exposed or have used Roundup and then were evaluated for different issues.

When I present to you during this trial, when Tamarra and Rakesh present to you, we are going to focus on the human data. The human -- I think it was one of the puzzle pieces, the human epidemiology.

And this is a publication by Dr. Portier. You heard a lot about Dr. Portier who's the expert that's going to talk to you about the animal studies and the cell studies, but he was part of an international group that authored this publication that talked about chemical assessments. And in that publication, what these scientists that were part of that group said is that (reading):

> "In the evaluation of human health risks, sound human data, whenever available, are preferred to animal data. Animal and in vitro studies provide support and are used mainly to supply evidence missing from human studies."

So what is that telling you? If you want to know whether a chemical or a product --

MS. WAGSTAFF: Objection. This is argument.

THE COURT: Overruled.

MR. STEKLOFF: If you want to know whether a chemical or a product is affecting humans, the evidence will show you should look at the human data because that is the best data to answer the question.

And part of the reason is because in those animal studies that you saw, what they do is they feed the animals with as much glyphosate as possible. So I think you heard about the maximum tolerable dose, something like that. I mean, just to be clear, what they do for these rats and mice are they give them as much glyphosate as they can possibly eat, and it is thousands and thousands times higher than a human could ever be exposed to in his or her lifetime.

And so that's why of all of those puzzle pieces, it's the human data, it's the epidemiology that helps you answer the question you need to answer.

So you saw a chart in opening of some of the studies that I think Dr. Ritz is going to walk through when she comes into the courtroom, and I want to talk to you about what the evidence will show about those studies because I believe that the plaintiff's evidence will be focused on four studies, and I want to walk through you what these numbers mean.

The blue chart here is how many people were in the study. So you can see, you know, it ranges between 3,417 people in the study in one of the studies and down to 1,656 in the second study there. But the yellow line shows you how many of those people were using glyphosate or were using Roundup, and those numbers are much lower.

Because a lot of these studies date back to the 1970s and the 1980s, while they were published later, the dates are later, they were studying people in those earlier time periods. And in those earlier time periods, Roundup wasn't used that much so they were using -- they're all farmers, or most of them are farmers, and they're using other pesticides. And what the numbers here show is the number of Roundup or glyphosate users in the studies that the plaintiffs are going to focus you on are very small: 184, 16, 97, and 47.

Now, you're going to hear evidence about this concept of adjustment for other pesticides so I want to talk to you about what that means.

I think the evidence will show that everyone agrees that in these studies, it is best to do something called adjusting for other pesticides. If you have used multiple pesticides but you want to find out if there's a relationship between Roundup or glyphosate and cancer, you need to try to isolate Roundup or glyphosate. You can't let the other pesticides play a role in your evaluation.

And there are statistical ways that epidemiologists, that people who do this try to address that issue and try to run statistical calculations to make these adjustments.

But what this shows is that when they did this in the studies, in these small studies that the plaintiffs are focused on, when they adjusted for other pesticides, it shows that there is no increased risk between glyphosate or Roundup and non-Hodgkin's lymphoma.

In the first study, the McDuffie study, they didn't even do the adjustments. So the people there were exposed to multiple pesticides while they were farming, and no adjustments were made.

In the second study, Hardell, when they did the adjustments, there was no increased risk for non-Hodgkin's lymphoma.

In the third study, De Roos 2003, they did an adjustment for pesticides but when they tried to adjust even further because of the importance of this issue, that further adjustment, the most adjusted number, showed no increased risk for non-Hodgkin's lymphoma.

And the same is true in the Eriksson study. When they adjusted for pesticides, there was no increased risk for non-Hodgkin's lymphoma.

So, again, these are the four studies that the plaintiffs are going to focus on. What is the study that the evidence

will show demonstrates that non-Hodgkin's lymphoma [sic] does not cause cancer and did not cause Mr. Hardeman's cancer? It's that study that was referenced called the Agricultural Health Study.

And the Agricultural Health Study had over 54,000 people in it. Of those 54,000 people, 45,000, almost 45,000, used Roundup or used a glyphosate product. The numbers, the evidence will show, pale in comparison to the other studies.

So what is the Agricultural Health Study? Well, this is actually the website of the Agricultural Health Study that you could go to today. To be clear, you cannot actually go to that website because Judge Chhabria, His Honor, has made very clear about that; but anyone could go to this website today at aghealth.nih.gov, and they could look at the study and they could get various information about the study.

You can see here there's a column for about the study, information for study participants. They talk about their scientific collaboration. They report their news and their findings. They have contact information.

And at the bottom of the page you can see some of the organizations that are involved in this study. The National Institutes of Health, which I talked about before, is the governmental organization focused on medical issues in this country. There's actually a specific part of the National Institutes of Health known as the National Cancer Institute

that is specifically involved in this study.

There's the National Institutes of Occupational Safety Hazards. There's the EPA, and you can see usa.gov. There are also academic universities, like the University of Iowa, that are involved in running this study.

You can go into the website, as I mentioned, and get more information. So on that study updates page, you can see even in 2018 they talk about their 25th anniversary edition, who is the Agricultural Health Study research team, the past 25 years, key findings from the study, and looking to the future because they continue, given the importance of agricultural health issues, to continue -- they continue to study these issues.

And so what is the Agricultural Health Study? Again, it's supported by the National Cancer Institute. Their goal -- one of their goals, and this is their language, is they want to identify and quantify cancer risks among men and women as well as whites and minorities associated with direct exposure to pesticides and to other agricultural agents.

And it's important to note that Monsanto or any other industry company has nothing to do with this study. They are not funding this study. This is an independent study run by the government and these various organizations.

And so what's the process that the Agricultural Health Study went through to help study these issues and help understand for people who are being exposed to pesticides what

they might see?

Well, first of all, the scientists who ran the Agricultural Health Study used two detailed questionnaires at different times to collect information from the over 50,000 people who signed up to be a part of this study.

The questionnaires included questions like which pesticides they were using, how many years and how many days they had used pesticides, how they sprayed the pesticides, whether they wore any protective gear. This was all so they could learn as much as they could about the people in the study and how they were using pesticides.

And what the evidence will show is that the people in this study who were using pesticides used pesticides more than anyone who's using Roundup or other pesticides around their yard.

Farmers who are using it are using it in different ways. Some of them might be using tractor-trailers, but some of them might be applying it directly. They're mixing it. They're using it in their own yards. There were also professional workers outside of farming who were using this, but these were people who were using it regularly all the time in different ways.

And they followed these participants since the mid-1990s and have collected that data over time so they can answer the question again in part whether there are cancer risks among

those people.

In terms of answering the cancer question, they have gone to independent state registries. If you're diagnosed with cancer, that information is collected by states by law in a database. So there's no question that they were going to identify people who are part of this study and see if they had cancer. They weren't going to miss that information.

Who were the Agricultural Health Study participants? In other words, who were the people being studied? I've talked a little bit about that. They used pesticides on farms, at work, and around their home.

Their average pesticide use at the time that they signed up in the 1990s was already 15 years. And then since then, they've collected another 20 years of data. So these people that are in this study, the almost 45,000 people who used Roundup, have been using pesticides, including Roundup, for over 30, close to 40 years.

And, like I told you, of the 50 or so thousand people who signed up, nearly 45,000 used a glyphosate product, including Roundup.

The authors and the people involved in this study at the National Institute of Health and the other organizations have collected this 40 years' of data and have issued over 250 published studies based on the work that they have done. This has been a massive exercise designed to give us the best

answers about pesticides, including Roundup.

And you're going to hear that the plaintiff's experts actually -- just to be clear, you saw it this morning, the evidence will show they're going to come in here and they're going to criticize the Agricultural Health Study; but at the same time they can't deny, first of all, that they respect the National Cancer Institute, Dr. Weisenburger will tell you that; and, second of all, you heard Dr. Ritz was an adviser to the Agricultural Health Study. So for years she was involved in that study. She has called it a beautiful study. She didn't have criticisms that were public of that study while she was an adviser to it. Then she became an expert for plaintiff's counsel. Now she will come into this courtroom and tell you that that study is not the study that should help you answer the question, but she only started criticizing the Agricultural Health Study after she became an expert in this litigation.

So what are the results of the Agricultural Health Study? You heard about De Roos. Remember there was a lot of talk in the plaintiff's opening about De Roos. There is a study called De Roos 2003. I've talked about that. De Roos is one of the authors who was involved in this Agricultural Health Study and in 2005, Dr. De Roos and other authors tried to answer the question: Let's take the people in the Agricultural Health Study, the 45,000 people and see if there is an association between their use of Roundup and non-Hodgkin's lymphoma. And

this is what they said in a published article in the environmental health perspectives, they said (reading):

> "There was no association between glyphosate exposure and all cancer incidence or most of the specific cancer subtypes we evaluated, including non-Hodgkin's lymphoma, whether the exposure metric was ever used, cumulative exposure days, or intensity-weighted cumulative exposure days."

And what that means is no matter how they measured it, there was no association between Roundup exposure and non-Hodgkin's lymphoma among those 45,000 people.

But they didn't stop there in 2005. In 2018 the authors of the Agricultural Health Study, the scientists involved in this study, looked at the question again. And this is their conclusion in 2018 about the Agricultural Health Study. They said (reading):

> "No association was apparent between glyphosate and any solid tumors or lymphoid malignancies overall, including non-Hodgkin's lymphoma and its subtypes."

The evidence shows that the most significant largest study with the most power demonstrates that there's no association between non-Hodgkin's lymphoma and Roundup use or glyphosate use.

So the authors, the evidence will show, of the Agricultural Health Study, they did another thing. They said,

"Let's try to take the 45,000 people that are part of this study and then get -- and then try to look at 45,000 people who are like them that have similar age, similar gender, similar race, similar characteristics, but aren't using Roundup like the other people."

What percentage of those people, just sort of regular people in the United States, would develop non-Hodgkin's lymphoma? Because, unfortunately, people develop non-Hodgkin's lymphoma every day. And the answer that they came to was 1.07 percent. So 1 percent of people in the U.S. population who have the similar characteristics to the 45,000 people would develop non-Hodgkin's lymphoma.

Now, what is the evidence going to show? You're here and you're hearing that Roundup causes non-Hodgkin's lymphoma. What is the evidence going to show about the 45,000 people who are using Roundup all the time? What is the rate of their non-Hodgkin's lymphoma? Because you would expect it would be much, much, much higher if Roundup is causing non-Hodgkin's lymphoma.

The Agricultural Health Study shows that the rate was almost exactly the same, less -- basically 1 percent; 1 percent of people in society who weren't using Roundup all the time developed non-Hodgkin's lymphoma and of the 45,000 people who were using Roundup all the time for decades, 1 percent developed non-Hodgkin's lymphoma.

The other thing that this data tells you that the Agricultural Health Study people published is that 99 percent, 99 percent of those 45,000 people who were using Roundup all the time in every possible way did not develop non-Hodgkin's lymphoma. And that's part of the reason that they concluded that there's no association between the two, between Roundup use and non-Hodgkin's lymphoma.

Now, what is the data also going to show, separate data? So this is not part of the Agricultural Health Study, but this data is also going to come into evidence during the trial. This is a chart of Roundup use over time and it shows you that, just like you heard in plaintiff's opening, in the '90s, that's when Roundup use really started to increase in the United States.

So you can see here, you know, starting around 1995 and then continuing into the 2000s and if you look at the data up until 2014 -- you know, it hasn't changed, but that's the most recent data we have -- that's Roundup use.

So what would you expect? What would you expect the evidence to show about non-Hodgkin's lymphoma rates if it's so associated with Roundup as you're hearing?

Well, what the evidence is going to show you is that the rates of non-Hodgkin's lymphoma in our country have remained steady. They have -- I mean, there's little, little variances but essentially they have stayed steady over time, and that

includes the concept of the fact that it takes time for people to develop cancer.

If in the 1990s Roundup use skyrocketed, you would see if the plaintiff's theory is true, then the evidence would show you that the rates of non-Hodgkin's lymphoma were increasing, but that is not what the evidence will show. That's the data that helps you answer the question.

So you heard a little bit about this group called IARC, which was that international agency in France that came together. And I don't want to talk about that for a long time, but I do want to touch it briefly.

And what I want to say is that you will hear no evidence that IARC in their classification of glyphosate has had any impact on doctors like Dr. Ye who are treating patients here in the United States. There will be no evidence that the IARC classification has changed the way that he is treating his patients who have non-Hodgkin's lymphoma every day.

Now, you're going to be instructed by the judge, and his exact wording is what will control, that you shouldn't be substituting your, I think this came up in jury selection, you shouldn't be substituting your judgment for any other group.

But it is true that the EPA has disagreed with IARC. So the EPA first approved Roundup in 1975. It determined that it wasn't carcinogenic, that it didn't cause cancer. It has reaffirmed that before IARC; and then since IARC, the IARC

decision came out in 2015, the EPA has reaffirmed its view that the evidence is not sufficient to show that glyphosate is carcinogenic multiple times.

And it's not just the United States EPA that you're going to hear about, which has done that across Administrations. You're also going to hear some evidence about Europe and the fact that Europe since the IARC decision since 2015 has also reaffirmed that Roundup is not carcinogenic and is not causing cancer.

MS. WAGSTAFF: Objection, Your Honor. Sidebar.

THE COURT: Overruled.

MR. STEKLOFF: So I want to go back to what happens, again, outside of this courtroom. What is the evidence going to show you cancer doctors, doctors like Dr. Ye and Dr. Levine, other doctors who are treating patients every single day with non-Hodgkin's lymphoma, what impact, if any, does Roundup have on their care and treatment of patients?

And this is what the evidence will show. They don't ask their patients about Roundup. They don't test for Roundup use in any way. They don't warn their patients about Roundup. And they don't say that Roundup causes cancer.

And what I want to talk to you for a moment about are Dr. Nabhan and Dr. Weisenburger, the plaintiff's two experts. Because to be clear, they are going to come into this courtroom and they are going to tell you that Roundup caused

Mr. Hardeman's cancer.

But they also practice outside of this courtroom. They deal with patients. They deal with other oncologists. They deal with pathologists, other pathologists. They deal with Tumor Boards or other medical doctors. I mean, you saw that at City of Hope Dr. Weisenburger was the chief of pathology. So he is meeting with doctors all across that hospital. They teach medical students.

What the evidence is going to show you is that Dr. Nabhan and Dr. Weisenburger have never told a fellow oncologist or pathologist that Roundup causes cancer. They've never taught a medical student that Roundup causes cancer. They've never gone to a conference of doctors and presented their views that Roundup causes cancer. And they have never told a single patient that they have treated, hundreds and thousands of patients, that Roundup caused his or her cancer. That is what the evidence will show outside of the courtroom.

Again, and this sums it up, they've never told a patient, they've never told a colleague, they've never taught a medical student, and they've never presented at a conference.

So, again, what is the question that you have to answer? Has Mr. Hardeman proved the question did Roundup cause Mr. Hardeman's cancer? And what is the evidence that tells you that the answer to this question is no?

First, it's the data. I've blown it up here, but these

are two pieces of data. What was the rate if you took the 45,000 people in the Agricultural Health Study and just found other people that were like them in society? 1 percent. What was the rate in the Agricultural Health Study? 1 percent. And 99 percent of those 45,000 people did not develop non-Hodgkin's lymphoma who were part of that study using Roundup.

And the same data that I just discussed about the use of Roundup over time and what the rates of non-Hodgkin's lymphoma are over time.

Next, both Dr. Weisenburger and Dr. Nabhan are going to tell you the evidence will show that Mr. Hardeman could have developed the exact same non-Hodgkin's lymphoma had he never used Roundup. So he could have had the exact same medical history. Everything could have been the same, and he could have never touched Roundup in his entire life; and unfortunately in 2015 he could have developed this exact non-Hodgkin's lymphoma. The evidence will show you that.

And then finally, what does Dr. Ye say? Dr. Ye is the independent oncologist who treats Mr. Hardeman for his cancer to this day. His testimony will show you that he would determine the cause of cancer in his patients if possible. He does not ask his patients about their Roundup use. He has never told a patient that Roundup caused his or her cancer, and he did not tell Mr. Hardeman that Roundup caused his or her cancer.

So when you have to go back and deliberate in a few weeks after you hear all of the evidence and see the witnesses, the answer to that question "Did Roundup cause Mr. Hardeman's cancer?" will be no. I thank you very much for your attention. It has already been a long morning. But as I said, we are just going to present the evidence that we need.

Thank you very much for your time and attention.

THE COURT: Thank you. We will take a five-minute break while we get ready for the first witness.

(Jury exited)

THE COURT: I have a number of items I will want to talk to you all about eventually, maybe over the lunch break, but in preparing for Dr. Ritz a couple quick things. One is that I assume nobody is challenging the qualifications of the other side's experts, correct?

MR. STEKLOFF: That's correct, Your Honor.

MS. WAGSTAFF: Your Honor, I believe we have challenged the qualifications of Dr. Arber in a pending Daubert motion in some of his motions.

THE COURT: Okay.

MS. WAGSTAFF: Not necessarily on his main or pathology opinion, but he gave some sort of peripheral opinions that I believe are still --

THE COURT: I'm sorry. I didn't recall that. I will go back and look at that.

But for any expert whose qualifications aren't being challenged by the other side -- obviously do what you need to do to establish to the jury that they are qualified -- but you don't need to ask me to qualify them as an expert, and you don't need to go through as much rigmarole as you might otherwise do with an expert if the other side were challenging the expert's qualifications.

Does that make sense?

MS. WAGSTAFF: Okay. That's helpful. Thank you.

THE COURT: And then just a reminder, you don't need to ask to approach the witness -- I mean, you will because you are in the habit of doing it; but you don't need to ask to approach the witness.

And let me see if there is anything else.

We should talk about Dr. Ritz's testimony about dose response, but my sense is that that is not going to be necessary to do before the lunch break or is it?

MS. WAGSTAFF: Your Honor, what time are you planning on taking a lunch break?

THE COURT: Around 11:45 or 12:00.

MS. WAGSTAFF: No. That will not be -- I can talk to her about that at lunch.

THE COURT: Okay. So what we will do is right at the beginning of the lunch break, we can talk about the dose response. You-all can decide -- and it may make sense for

Dr. Ritz to be in the courtroom for that discussion for the boundaries to be established properly -- but I will let you-all think about that.

But in the meantime, why don't you go ahead and we will call the jury back in. We can get Dr. Ritz in and get her on the stand and get the jury in.

MS. WAGSTAFF: I need to run to the restroom.

THE COURT: We will take two minutes, and then we will be back.

(Whereupon, a short break was had.)

THE COURT: The other thing is you can have your witness on the stand when we come in to bring in the jury.

(Jury entered.)

THE COURT: Okay. The Plaintiff can call his first witness.

MS. WAGSTAFF: Your Honor, the Plaintiff calls Dr. Ritz to the stand. I just saw her in the hallway, so --

DR. BEATE RITZ,

called as a witness for the Plaintiff, having been duly sworn, testified as follows:

THE CLERK: For the record please state your first and last name and spell both of them.

THE WITNESS: My name is Beate Ritz, B-E-A-T-E R-I-T-Z.

THE CLERK: Thank you.

DIRECT EXAMINATION

BY MS. WAGSTAFF

Q. Good morning, Doctor -- good afternoon, Dr. Ritz.

A. Hi, Aimee.

Q. How are you doing?

A. I'm good.

Q. Okay. Have you ever testified in front of a jury before?

A. No.

Q. Okay. So why don't you tell the jury a little bit about yourself?

A. So my name is Beate. That is a German name but I'm American. I have lived here since 1989. I got a medical degree from the University of Hamburg. And as a doctor, I was extremely frustrated not to be able to prevent diseases and just having to treat them. So I decided I want to go into public health, and the best schools of public health were in the U.S. And I came to California because I -- there was a really good school at UCLA. That was in 1989. And I have been there ever since.

So I went through the program at UCLA; and when I came here, I was already interested in occupational and environmental health. And while I was at UCLA, I started on a big worker health study in the nuclear industry; and when I graduated, UCLA wanted to hire me. So they actually hired me in 1995, and they hired me in an organization within the

university that is called the Center for Occupational and Environmental Health, and that is actually a really interesting institute because it was formed by legislative demand in 1980 because there was an incident in a little -- in a company called Oxy Chemical in Lathrop, California, not far from here, where workers realized they couldn't have children. And what the company produced was a pesticide. It was a fumigant that was mostly exported to other continents for treatment of fruits and vegetables, pineapples and bananas and other things.

And so when these workers then demanded an investigation of what was happening to them, there weren't any doctors who could actually do this research. And what happened is that the California legislature was so upset that among all the doctors in the UC system nobody knew how to do a study, they demanded that Centers for Occupational and Environmental Health would be formed, and that these centers should be having doctors, researchers and people who could go out in the community when something like this happens.

So my position is actually one of ten at UCLA where we are tasked to do exactly that; to do research that improves the environment and improves the working conditions of people in California. And that is what I really have been trying to do for the last 20 years since I was hired -- more than 20 years now.

Q. Excellent. And you are a medical doctor, you just said --

A. Yes.

Q. -- but you are also an epidemiologist, right?

A. Correct.

Q. So please explain to the ladies and gentlemen of the jury what epidemiology is and what you do as an epidemiologist.

A. Right. So in that discipline, epidemiology, it is part of public health, and actually I would consider it the basic science of public health; and that is because we are studying -- we, as researchers, are actually studying what causes disease.

So in a sense what I'm interested in is finding out does a work environment with certain exposures to the workers cause that disease that I'm seeing among the workers. If, for example, somebody lives in a very polluted neighborhood, we would be investigating whether the air, the water, the soil contamination is responsible for the disease. The way we do it is not like a doctor who diagnoses a disease and mostly treats patients and has some suspicion of what could cause the disease. We are also tasked with finding out what does cause the disease.

That is not easy, right, because you have many, many different things you breathe, you drink, you get contaminated with when you work in your garden or which workers use when they are in their jobs; right? But we have to figure out what is it that is toxic and that is actual linked to this disease.

And the only way to really do this would be to turn back the clock, to use a time machine.

So when we see the people who are sick, right, everything has already happened. What we want to know is if we go back in time and take away that one exposure that caused their disease, would they not have gotten sick, and that's what I call the time machine. And that's how we think about it.

You know, people get sick. Lots of things happen throughout their lifetime until they get sick, but what was it that I would have to go back and take out that would prevent them from being sick. And, of course, you know, we know Hollywood and they have movies in which we can turn back the time and, you know, try it, do an experiment. Take out this and see what happens. But in real life, that's not possible.

So what do we do? We are looking for people who live a similar life, who have a similar job, who live in the same neighborhoods, and then we are trying to figure out, okay, what is different among those who actually got the disease, and those who are still healthy and they are the same age. They are the same sex. They are the same socioeconomic status, income. Maybe they are even workers at the same company. But what is it that distinguishes that worker from this so that that worker got the disease and this one didn't; right?

And so we are comparing groups of people who we hope are most similar to each other except for the one exposure that we

are interested in. And then we come to a conclusion that, yes, the rate of disease among the exposed, the workers who had this one exposure, is higher than the rate of disease among the people who didn't have the exposure. And that is what we call the rate ratio, and odds ratio, risk ratio, meaning the number of people exposed is -- and who got sick is larger than the number of people who weren't exposed and did not get sick. And those numbers are usually above 1. When we see these numbers above 1, we know there is more happening among the exposed that should not have happened had they been unexposed, had we kept that exposure away from them.

It sounds easy, but it is really difficult to find the right comparison and to do these studies right. And this is what I teach at UCLA to my students. I just right now teach it three times a week. So tomorrow my TA is in charge. And -- I hope they do a good job -- and it is not easy. The students struggle with these concepts, and I really feel for you that you have to sit through this. So bear with me.

It is not easy, but what we are trying to do is really compare two groups because we don't have the time machine to go back and take each exposure out and then see whether the person would still get sick. Rather, we are looking at groups of people, comparing them.

Q. All right. Thank you, Dr. Ritz.

Will you explain to the jury what environmental

epidemiology is and if there is a difference between environmental epidemiology and epidemiology, just general epidemiology. Can you explain if there is a difference?

A. Right. So environmental and occupational epidemiology, because the highest exposures we ever have are actually mostly in occupational environments, so workers have always been our canaries in the coal mine, so to say, for most exposures that we are trying to figure out, are they health relevant. Do they cause disease; right? We like to go back to workers because they are the ones at the front line of everything.

So environmental and occupational epidemiologists, my specialty, really are the experts in trying to figure out what exposures are, how large they are, how we can measure them, how we can measure them over a very long time period, and then link that to any disease that people might want to figure out. So we are not the specialists in one disease or the other; although, all of us have their favorites, right, cancer, neurodegenerative diseases, child diseases.

But we generally are the people who are figuring out the exposure and how much of it do you need, how long do you need to be exposed, when do you need to be exposed. For example, do you already have to be exposed in childhood? Is it bad when pregnant women are exposed or is it especially bad that you are exposed when you are elderly because you don't have the defenses anymore? All of these things is what environmental

and occupational epidemiologists do.

Q. All right. Are you familiar with the International Society of Environmental Epidemiology, otherwise known as ISEE?

A. In fact, I'm the president.

Q. Okay. So you are --

A. Yes.

Q. -- familiar with it.

Will you tell the ladies and gentlemen of the jury what ISEE is, what it stands for and what your role is there?

A. So this is an international society of professionals. It is called the International Society of Environmental Epidemiology where people like me come together, and we come together every year for an annual conference; and in between we have many working groups where we are figuring issues out among colleagues. And it is thousands of people like me, all over the world, who get together to discuss issues of our science, and we are very critical of each other; and we are critical for a good reason because we try to figure out the best science.

And really, this is where our students come. I love the society because it has a lot of young people, and we are training our students to be able to go there. We are encouraging them to present their research and to be challenged because, you know, in order to find the truth, we have to challenge each other and we have to learn to stand up to being challenged, to defend our position, and to be truthful and do

the best studies we can.

Q. All right. So are you familiar with the epidemiologist that Monsanto has designated in this case?

A. Yes, I am.

Q. Dr. Mucci and Dr. Rider; correct?

A. Right.

Q. Are either Dr. Mucci or Dr. Rider an environmental epidemiologist?

A. No, they are not.

Q. And what is the significance of that with respect to an opinion that they would give in this case?

A. Dr. --

MS. MATTHEWS: Objection.

THE COURT: There is an objection.

MS. MATTHEWS: Objection to collateral use of --

THE COURT: Overruled.

BY MS. WAGSTAFF

Q. You can answer.

A. Okay. So these are two young colleagues who are specialists in a different field. It sounds like epidemiology that should encompass every epidemiologic study or every study of human health, right. But we have branches, and the branch that Dr. Mucci and Rider are specialists for are molecular epidemiology. That is a very technical term, but what they mostly know to do is to test cells and to test genetic factors

that contribute to disease, to cancer.

And they also have -- so it is much more a -- it is much more detailed in terms of the technology, but they have no training or no specialty in going out into the field, which I do, and asking people about their work or their environmental exposures. It is really hard to capture environmental and occupational exposures over a lifetime and, therefore, we are a specialty. And that's not what these two do. They have never done that.

Q. All right. Have you ever, yourself, developed an exposure assessment model?

A. Absolutely, yes. That's my job.

Q. Okay. So can you tell the ladies and gentlemen of the jury what an exposure assessment model is and maybe describe one that sort of exemplifies what you have created.

A. Right. So as a student, I had it easy. I worked with workers in the nuclear industry, and the nuclear industry, as much as we can say, "Oh, my God, they are exposing workers to radiation," they very early on were regulated quite well and the workers actually had to wear badges. So every day they would go into the facility. They would put on their badge, and that badge would read -- you would be able to read off that badge how much exposure in radiation dose they got; right?

So my job was really easy as an occupational epidemiologist. I could just, you know, collect all these

badge readings, and then reconstruct what the dose of the worker was throughout the time they worked at the facility; and I could easily find out, okay, this worker had a low dose. This worker had none. This worker had a high dose.

And what I told you before, I then compared the high dose to the medium dose to the low dose, and we looked for leukemias and for other cancers, right; worried that workers exposed would have had these diseases. And, lo and behold, we found that. That was my easy job in terms of exposure assessment.

When I graduated, I thought I would do something a little more challenging. Guess what? Pesticides are really challenging to figure out. So one of the first things I did when I was a junior professor was to say, Well, we have an agricultural state. We don't look like it when we are in San Francisco or LA, but go to the Central Valley, right? So I actually set up most of my research in the Central Valley because I believed there -- the Central Valley is where people are exposed occupationally and environmentally to more toxins than anybody else. Okay.

THE COURT: One moment, Doctor.

MS. MATTHEWS: Objection. Relevance at this point, Your Honor.

THE COURT: Overruled.

THE WITNESS: So -- and I know that these pesticides are being used for a good purpose. I'm not saying any of the

farmers are doing this because they -- they intend to harm someone. The opposite. They want to put food on your table; right? They want to -- they want to give you fruits and vegetables and nuts that we all like to eat and think it is nutritious, and we should eat them; but they also need to defend themselves against pests, insecticides, fungi that rot the oranges, et cetera.

So I know from my perspective that the Central Valley is really a big experimentation hub for pesticide exposure in humans, and it is for workers and it is for residents.

So the exposure models that I built was actually based on something very unique in California, and California should be proud of it. In 1974 the legislature decided yes, we are using a lot of pesticides; but we better make sure where they are used, who uses them, when they are used and how much is used. And they created, by state law, something called The Pesticide Use Reporting System so that applicators, farmers, professional pesticide applicators, they actually have to report all of this to the State every month or every year; and that goes into a big database. And that database, when I became a junior professor, hadn't ever been really used for human health studies, and I said here is something I can do. I love numbers. I love big numbers and I love modeling. I love workers, the environment, and I want to do this. Give me the data, and I want to figure out whether these pesticides

actually are doing something they shouldn't, including harming individuals who live and work with them; right? And how we can hopefully figure out to prevent that, because that's in the end all I want to do. I want to prevent this from happening; right?

So what we did is we downloaded these databases, and then students over years worked on mapping them. So we now have an electronic database where we can say what has been applied on what field, at what time, in what amount, for the whole of California. We started with three small counties -- Tulare, Fresno and Kern County -- and we developed this mapping system so that we can now say every worker, every individual who lives there, we can tell who was sprayed around their homes, what was sprayed around the workplaces; and we can summarize the amount of pesticide in -- and the amount of pesticide and the timing of when it was applied in the Central Valley, and I have done many, many studies on that.

Q. Excellent. Thank you.

How about for -- your work on the California Air Resources Board panel, can you tell the jury a little bit about your work on that?

A. Yes. So about six, seven, eight years ago I was appointed to the Air Toxics board. That is not so surprising because I'm one of very few professionals in the state of California who is tasked with preventing occupational and environmental exposure

and figuring out what they do.

So we have an agency in California called the OEHHA, the Office of Environmental Health & Hazard Assessment, and they are tasked by the State of California to keep your air clean and to prevent you from breathing toxic contaminants. Pesticides are some of these toxic contaminants, air toxic contaminants. These are people who work in a bureaucracy. They are scientists at OEHHA, and they are trying to figure out what different chemicals do and whether or not they should actually be considered an air toxic. So when they do this -- that is their job. But at the end of their evaluation, when it comes to, okay, this is an air toxic and here are all the arguments why it is, a lot of times animal studies, cell studies and some human studies. And then they -- they need an expert panel -- and I'm one of those experts -- who then evaluates that report before they are allowed to go to standard setting because we want to make sure that what they are actually doing is scientifically valid.

And they are -- they are bringing all the science together and evaluating what is out there, but they are not doing the science. So the people who are just bringing it together and evaluating and setting standards to protect the public, they are not -- they are not ever the ones who are doing the science, and so the link is you need a scientist like me who goes out there and actually collects all this information and

then puts it together and does a study to see whether what their summary says is actually accurate and whether they truthfully represented what is in those studies and whether the conclusions that they come up with, I or my panel would agree with. So I'm appointed to that.

Q. All right. Who appoints you to that?

A. The Governor.

Q. The Governor of California?

A. Yeah.

Q. Okay. Have you done any work with the National Academy of Science or the Institute of Medicine?

A. Absolutely.

Q. Could you tell the jury a little bit about your work with those entities and maybe explain what they are as well.

A. Right. So the National Academy of Science is actually quite old. That is a federal agency -- not agency. It is a not-for-profit organization, but it was mandated by the federal government -- actually by Abraham Lincoln in '63 -- 1863, as an independent body that gives the government scientific advice when they need it. So it -- and this body has been functioning ever since and giving scientific advice.

And some of the advice that I was asked to give -- and have been sitting on five or six of these panels since 2000, ever since I wasn't as junior anymore -- so what I was asked was mostly to come in for the Veterans Administration and

evaluate the science on Gulf War Syndrome and all the Gulf War-related disorders from air pollution, from pesticides, et cetera. And I think I have been sitting on at least three of those.

And more recently, on a bigger panel that was called Risk Assessment and Guidelines for Risk Assessment in the nation.

Q. Okay. And did you receive an award recently?

A. Yes.

Q. Can you tell the ladies and gentlemen of the jury what award you received?

A. Yes. So I was very surprised in January when I got an e-mail from one of my students and then a cake that said "Top 1 percent," and I was What is this? It turns out that there is an online machine learning tool and company that actually figures out how often as a scientist you are cited -- your work is cited worldwide, and then they are naming the scientists who are among the top 1 percent in the world whose science is being cited by other scientists, and I made the list.

Q. Congratulations.

So let's move onto journals and medical journals. Can you explain to the ladies and gentlemen of the jury, what a medical journal is and how it comes -- well, why don't we start with what a medical journal is.

A. So A medical journal is the main instrument of communication between scientists. Once you have done a study,

you have to write it up; right. And you write up why you did it, how you did it, what you found; and then you discuss what it means; right. And the journals that publish these articles, they are really giving us an outlet to give this information that we are collecting and putting together to the public.

And as a journal, they have the duty to make sure that what we have been doing at UCLA, at Berkeley, wherever, is actually not junk; right. It is actually truthful, good science. And so what they do is they ask peers -- these are other scientists -- hopefully experts, hopefully in the field that you are working at -- to read these articles and to think about -- the articles have to have enough information so that your peer, the person who also does these kind of studies, knows what you have been doing; can follow why you have been doing it, and what you have been doing and evaluate whether what you are saying about what you did is enough that you can come up with the conclusion that you made in your -- in your study. And none of these peers are ever paid to do this. This is voluntary work. It is a lot work. It is hard work, but it is what keeps us honest as scientists; right?

If there wasn't somebody -- and they are judges in a way because if we cannot satisfy our peers or other experts with what is in these papers is actually the truth in some way, as long as they can follow what I did, then the paper -- they can recommend the paper not to be published. They recommend a lot

of changes. When they don't understand something, I have had papers where I had to write more explanations than the paper was long to the peer reviewers, and I had to do it multiple times until they finally understood why what I was saying was actually okay. And then the editors evaluate all of that and say, okay, now, that the peer reviewers are satisfied, maybe I still have a problem with this; and they come back to you and have that problem. And in the end they decide whether you answered all the questions and if what you are actually producing in this paper is truthful and valuable and valid.

Q. All right. And have you ever been a peer reviewer yourself?

A. Absolutely. I do it all the time.

Q. Okay. And you mentioned an editor who is above the peer-review process. Have you ever participated on an editorial board?

A. Yes. I was an associate editor.

Q. Okay. Were you an associate editor for a medical journal?

A. For an epidemiology journal.

Q. Okay.

A. So that's -- epidemiology is my profession. So --

Q. So have you served on the -- what journals have you served on the editorial board of?

A. Epidemiology and I do -- I also -- one on current opinion in environmental health, which pretty much reviews bigger areas

of environmental and occupational studies. I stay away from editorial boards because there is only so much time in a day, and I'm already president of my society. I teach. I do research. And, you know, I travel a lot. And I -- I try to do what I do as well as I can, and I would feel not having enough time to be on yet another editorial board. So currently I am not.

Q. All right. And aside from being a peer reviewer and on editorial boards, have you, yourself, been published and had your papers go through this peer-review process?

A. Absolutely. I wouldn't be at the University of California anymore if I wouldn't be publishing and publishing a lot. We are evaluated every -- all -- every two or three years for what we are publishing and producing. It is called productivity. So actually mine was pretty good. I now have about 270 papers that are peer reviewed in the literature that came out since 1995.

Q. All right. And are those 270 peer-reviewed literature articles that you wrote, are they on epidemiology?

A. They are on the epidemiology of different diseases including cancers and mostly environmental and occupational causes.

Q. All right. Do those articles that you had peer reviewed that you wrote, do they consider your exposure models and your exposure methods? Do those -- are those included within the

articles?

A. Absolutely. It is actually what I'm known for.

Q. Okay. Were you asked by the State of California to advise on pesticides?

A. Within my Air Toxics board appointment, pesticides come up. So last year chlorpyrifos, which is a very commonly known used insecticide -- actually it was the most used indoor insecticide we had in California until it was banned from indoor use. It is still being applied in the fields. That has been evaluated by that board last year.

Q. All right. Excellent.

MS. WAGSTAFF: Your Honor, this may be a great time to break for lunch.

THE COURT: Okay. Sounds good. Why don't we take a slightly longer break than usual today so you-all can find your way around the building and stuff. I noticed that the clock is -- this clock is five minutes slow. Why don't we plan on coming back here at 12:45; not 12:45 by that clock, but 12:45 by your iPhone, which will be about 12:40 by this clock.

Remember my admonition by the way. I'm going to sound like a broken record on this stuff, but it is very important, critical that you not talk about the case with anybody or amongst yourselves; that you not conduct any sort of research or anything like that about the case or anybody involved in it. And no Google searches, not even for a term that was used in

the case. You shouldn't do any kind of research at all.

If anybody tries to talk to you about the case, you should let us know immediately.

With that, have a good lunch. We will see you back here at 12:45 by your iPhones.

(Jurors exit.)

THE COURT: Dr. Ritz, sit tight for just a second. Should we talk about the Dr. Ritz -- the issue of dose response now with Dr. Ritz here or how would you like to proceed on that?

MS. WAGSTAFF: That works. I also want to make sure that we are all on the same page with respect to medical literature as well just so I don't get on even thinner ice with you.

THE COURT: Okay. So on the issue of dose response -- first of all, by the way speaking of thin ice, can I have a copy of both of the slides for both sides' openings? Do you-all have that handy? Can you hand up a copy of your slides?

MS. WAGSTAFF: I don't have it printed out --

THE COURT: That's not -- that can't be true.

MS. WAGSTAFF: Well, the version -- I pulled slides out based on what you talked with Ms. Moore about, so --

THE COURT: I will take that.

MS. WAGSTAFF: -- this isn't what I used.

THE COURT: Okay. That's fine. That is your full version that you were planning on using? That's fine. I will take that.

MS. WAGSTAFF: Well, I feel this will be held against me.

THE COURT: That's okay. I will take that.

MS. MOORE: Your Honor, we can have a clean version.

THE COURT: No. That's okay. I will take that one.

MS. WAGSTAFF: I have notes in here, so can I take those out?

THE COURT: On slides?

MS. WAGSTAFF: No. These are --

THE COURT: Yeah, take out your notes. Sure. Thank you.

MS. WAGSTAFF: Can I just review it one more time?

(Whereupon, a brief pause was had.)

MS. WAGSTAFF: And I ran out of color ink halfway through printing it.

THE COURT: That's fine.

MS. WAGSTAFF: This copy that I'm handing you includes the RFA that we had talked about before, so obviously that wasn't shown to the jury.

Also I took out an *Eriksson/McDuffie* slide when you get to the specific causation portion that I didn't show to the jury.

THE COURT: Okay.

MS. WAGSTAFF: And in my exposure slide, there is a bullet point in what I just handed you that discusses warnings and whether or not Mr. Hardeman followed those warnings and labels, which I took out as well. I deleted based on your conversation with Ms. Moore prior to my openings statement as well.

THE COURT: Okay. I will ask by the way, Kristen, if you can contact GSA and ask them to fix that clock. Get it tied to the iPhone.

Okay. There was just -- while it is on my mind before I forget, there was a photo of Mr. Hardeman and his family that you described as a photo that was designed to show the jury the property. It was not designed to show the jury the property. It was designed to show Mr. Hardeman's family.

So that's -- I'm not allowing that photo to come in in Phase One.

Okay. Now, let's just talk about the dose response issue for Dr. Ritz and any other -- anything else you want to talk about with respect to the articles, and I have a couple other items; but I will put those off for now.

MS. WAGSTAFF: It is my understanding from talking with Monsanto's attorneys that we have an agreement that we will publish medical journals and articles to the jury but not send them back into evidence; is that --

THE COURT: That's what you-all told me.

MS. WAGSTAFF: Okay.

THE COURT: And that I agreed to quite a while ago, yeah.

MS. WAGSTAFF: Just before I did it, I wanted to make sure we were all on the same page.

MR. STEKLOFF: No issue there, Your Honor.

THE COURT: Okay. So on the issue of dose response, this is one -- I mean, I -- as I said, there are a number of places where the Plaintiff -- or Ms. Wagstaff crossed the line in opening statements, and it seems pretty clear that it was intentional.

On the dose response issue, as I mentioned at sidebar, I'm not sure I would put that in -- put the dose response issue in that category because I think that is actually quite a challenging issue, right, based on my rulings. And what I ruled was -- that Dr. Ritz's testimony from -- from the general causation phase, at least as I recall it, was that there is a dose response -- that the literature shows a dose response. And what I recall from Dr. Ritz's testimony is that she didn't get behind any particular numbers. She didn't say if you use Roundup more than ten times in your life, your -- your risk of getting NHL will double. I don't recall you saying anything like that.

THE WITNESS: No, I didn't.

THE COURT: So what I meant to convey -- what I

intended to convey in the specific causation order that I issued yesterday is that that testimony -- that general testimony that Dr. Ritz gave is permissible, and that she can use *McDuffie* and *Eriksson* to make the general point that there is evidence of a dose response.

But then when you get to the specific causation phase and you have people like Dr. Nabhan and Dr. Weisenburger testifying that they -- you can reach some sort of quantitative conclusion based on those studies, that's not permissible. That crosses over into the area of junk science.

So that's the basic parameter that has been established not just for Dr. Nabhan and Dr. Weisenburger, but all of the experts.

And so the question is: Are there any concerns about, you know, types of testimony that would be close to the line that we should resolve now? It seems to me, as I said, I believe that the line was crossed during the opening statements. It is not as clear that that was intentional as some of the other stuff, but I -- it seems pretty clear that the line was crossed during opening statements. So perhaps we have to have a further discussion sort of defining that line.

MR. KILARU: Yeah, I think the slides did cause concern in light of the rulings, Your Honor, because I believe there were three slides, though I know one was sort of clicked through in the earlier rulings; that showed that there is an

over 200 percent increase risk from the slides. I think one was 236; one was 212, and I forget the third exactly -- 210, I'm told -- that is the exact type of testimony that we think crosses the line that was set forth in your order where you said that no one really can testify if someone uses Roundup more than two days or ten days, their risk of developing NHL doubles. And I'm not really sure if there is any space between those two things.

THE COURT: Well, but the reason it is a tricky issue I think, is that there are numbers that emanate from the *McDuffie* and *Eriksson* studies. And, I mean, we could have a discussion about this. My intention when -- from the -- when I wrote what I wrote in the specific causation order was not necessarily to preclude the Plaintiffs from eliciting testimony about the numbers that emanate from *McDuffie* and *Eriksson*. It is just that they could not provide -- they could not offer on opinion that those numbers stand for this sort of quantitative proposition.

Again, that is a tricky line. I mean, maybe the answer is that the numbers shouldn't come in at all; but my -- but what I was -- what I was envisioning when I wrote that is that the experts -- they can say what the numbers stand for. The qualification has to be made about, you know, the fact that these are unadjusted numbers and also the overall numbers of the subjects in the studies are very low.

But -- and with those qualifications, you can say that, you know, they are -- they are somewhat probative -- they are probative of dose response without drawing any quantitative conclusions. That is tricky.

I mean does that -- do you understand what I'm saying?

THE WITNESS: Absolutely. Absolutely.

THE COURT: So what -- how are you with that, I guess I will ask.

MR. KILARU: I guess I would say we do have a concern with the numbers -- not all the numbers, but *McDuffie* and *Eriksson* being showed. I think these issues are all tied together. As I think you said in the order, the numbers are unadjusted. So if you present unadjusted numbers, whether you describe them as a doubling of the risk or just show what they say --

THE COURT: I never said either at general causation or the specific causation stage that unadjusted numbers are inadmissible. Now, I think there is probably a decent argument for that.

MR. KILARU: Yeah.

THE COURT: But I ruled -- I didn't rule that they are inadmissible. What I ruled is that they -- they can't be relied upon to -- for -- by an expert to predict the -- how much somebody like Mr. Hardeman has an increased risk if he used glyphosate, a particular amount more than ten lifetime

days.

So I'm not prepared at this point to preclude an expert from testifying to the numbers themselves. It is a bit of a tricky line, I think. And, you know, it is one that everybody is going to have to be paying attention to during trial, but I do think -- just to make clear for the record, right -- the stuff that was in the slide is not appropriate. That is -- of course, that was not an expert opinion --

MR. KILARU: Right.

THE COURT: -- that Ms. Wagstaff was describing. That was her own interpretation of the numbers, and that is not appropriate. And it is not appropriate for an expert to offer an opinion reflecting the content of those slides.

MR. KILARU: I do agree that it is a somewhat gray area, as you said. I mean, the slides are clearly on one side. Maybe the numbers -- you know our position on the numbers, at least as I just articulated. Unadjusted numbers shouldn't be admitted because they are unreliable, where we think it is embodied in the order.

Where I think we might have some concerns about the testimony is if you start to get into -- it is a hypothetical, but what is the risk ratio in this piece? It is above 2. What does 2 mean? Well, it means the risk is doubled. They are basically presenting the exact same thing just without a percentage number. That's where I think the line would

probably be crossed as well.

THE COURT: I'm not sure -- we could probably go through 20 hypothetical questions and answers --

MR. KILARU: Right.

THE COURT: -- and I can issue rulings in advance. Then there will be a 21st question asked and answered. I don't think it is worth trying to do that in advance.

What I will say, however, is that there is a possibility that, you know, a specific instruction regarding the use of unadjusted numbers could be given to the jury. And I think the chances of that happening increase the more the Plaintiffs elicit testimony about the unadjusted numbers, and the more the Plaintiffs attempt to get the jury to draw quantitative conclusions about the unadjusted numbers.

So we will have to just kind of see how the evidence comes in, but it may be that a limiting instruction of some sort is appropriate.

MR. KILARU: That may make sense, Your Honor. I just wanted you to know a general gist of how we are thinking about this. I know there are many, many variables; but it sounds like it might make sense to see how it comes in, and we would be happy to prepare an instruction if we think a line has been crossed.

THE COURT: Okay.

Anything from you, Ms. Wagstaff?

MS. WAGSTAFF: No, Your Honor.

THE COURT: Dr. Ritz, does that -- are you comfortable with that?

THE WITNESS: Yes.

THE COURT: Okay. Great. So let me see. Was there anything else I wanted to discuss with you right now?

Oh, what is the status of the stipulation -- there are a bunch of potential stipulations floating around out there. What is the status of the stipulation regarding expert compensation?

MR. KILARU: I think we are willing to agree to what Your Honor proposed. We might propose to switch the word "a lot" for "substantial," but I think we are on the margins at that point.

MS. WAGSTAFF: We actually haven't really discussed it with each other.

THE COURT: There was some indication -- some e-mail --

MR. KILARU: We both said we were --

THE COURT: There was some e-mail from someone on your team --

MS. WAGSTAFF: I told you in the hearing that we were okay, as long as the wording wasn't that they were each paid a lot of money.

THE COURT: Okay. So -- but we have an expert on the

stand now. So why have we not figured that out, figured out what -- how -- the extent to which people are going to be questioned on their compensation?

MS. WAGSTAFF: I'm not going to question her on her compensation, so it wasn't really a priority to me.

THE COURT: You need to -- you need to figure out by -- how long do you think Dr. Ritz's direct will take?

MS. WAGSTAFF: Okay. Apparently in Australia they told Mr. Wisner they would give us a copy. We can figure this out probably in five minutes.

THE COURT: Why don't you do that?

MS. WAGSTAFF: Okay.

THE COURT: Good. We will see you-all at the actual time of 12:40. Thank you.

You can step down.

THE WITNESS: Thank you.

THE COURT: And you can have -- I think I said this before, but you-all should have your witnesses on the stand when the -- when we are ready to bring the jury in so we don't waste that extra time bringing the witness in when the jury is already sitting there.

MS. MOORE: Thank you, Your Honor.

THE CLERK: Court is in recess.

(Luncheon recess was taken at 12:10 p.m.)

Afternoon Session **12:48 p.m.**

(Proceedings were heard out of presence of the jury:)

MR. STEKLOFF: Your Honor, I just want you to -- for it to be clear. I have no problem with you having it, but the PowerPoint that I handed you included an appendix of slides that I did not use. I'm just hoping that Plaintiffs' counsel doesn't see them, but it doesn't bother me one way or the other if you have them.

THE COURT: I look forward to reading them.

MR. STEKLOFF: Second, Your Honor, I think we have reached a stipulation on the expert compensation, which would be to take your language but substitute "significant" for "a lot," but then add the phrase based on customary -- normal and customary rates. So that -- which would apply to both sides.

THE COURT: That's great. So are you going to want me at some point to read that stipulation to the jury?

MR. STEKLOFF: I think it -- my view is that it would make more sense for you to read it since it applies equally to both sides as opposed to having one side read it --

THE COURT: Okay. So at whatever point you get that stipulation to me and you file it, I will just read it -- I will probably read it to the jury at the beginning of tomorrow's testimony.

MS. MOORE: That is helpful, Your Honor. We will get that. We will send that over to them, and I think we have got

that done.

THE COURT: Great. One other thing I wanted to raise with you now, even though it is not immediately relevant, is that I -- you know, you were showing slides of deposition testimony of the Plaintiff's experts. I understand your theory behind that. My -- your theory being that the Plaintiff's experts, when they were having their depositions taken, were agents of the Plaintiff and, therefore, their deposition testimony is admissible under Rule 80 -- 801(d)(2).

I do not believe that there is any binding Ninth Circuit case law on that issue, whether an expert when their deposition is being taken is acting as a -- as an agent of the party. I believe that the -- that -- I believe that an expert is not -- should not be deemed to act as an agent -- be acting as an agent of the party during deposition testimony.

I think there is also a strong argument that they shouldn't be deemed as acting as an agent of the party during trial testimony, but regardless, I think there is a distinction between the two, and so that's why I shut you down on that. If you can point me to some binding authority that says to the contrary and you want to cross-examine experts using their deposition testimony, you can try to point me to that authority.

I will also say I think it is a Rule 403 issue, particularly in a case like this. I think that the trial --

there is a real risk of the trial becoming much more jumbled and confusing if we use as a starting point the expert's deposition testimony rather than the testimony the expert has given at trial.

So I believe that for the experts, both because of my interpretation of Rule 801(d)(2) and because of Rule 403, I believe the way it should go is that you use an expert's deposition testimony the same way you use any other witness' testimony, which means you bring it in to impeach them and not use it as part of your affirmative case or affirmatively as the basis for your cross-examination. Like I said, if you want to try to point me to some authority that is to the contrary, I'm happy for you to consider that. But as of now, that is my ruling.

MR. STEKLOFF: And I understand your ruling and don't need to go look for authority, I think with the witnesses -- I'm fine using it, if necessary, as impeachment if they don't agree to it.

THE COURT: And on the issue of impeachment, I always assume that lawyers know how to use prior deposition testimony for impeachment purposes, and 90 percent of the time I find myself having -- in the middle of trial having to teach the lawyers how to use prior deposition testimony for impeachment purposes, to my surprise.

So if you wish to impeach a witness with deposition

testimony, whether it is an expert or some other witness, you have to have a transcript of the deposition ready to hand up to me. You do not immediately start asking them questions about their deposition testimony or the content of their deposition testimony.

You simply say, "Your Honor, I would like permission to read pages 17, line 6 through 18, line 10," and then pause. You give it to me. Give me the deposition testimony. I look at it. Opposing counsel has an opportunity to object or to request that for completeness in addition you read page 27, line 32 through 36.

And then I will rule on whether you can read the proposed deposition testimony and whether you must also read for completeness the deposition testimony that the opposing side has identified. Then you can read it, and then if you want -- although most good lawyers don't -- if you want, you can ask further questions of the witness about whether their prior -- how their prior deposition testimony squares with their current testimony.

But in any event, that is the process for impeaching witnesses with prior deposition testimony.

MS. MOORE: Thank you. Your Honor, understood.

MR. STEKLOFF: While we are on the subject, just for 20 seconds, what is your rule during trial about contact with expert witnesses in the middle of testimony, either once they

have been passed for cross or before or after?

THE COURT: If you-all have sort of a stipulation about that, about how -- not a stipulation but agreement about how that should go, that's fine. Otherwise, I'm happy to hear discussion of it.

MR. STEKLOFF: Okay.

MS. MOORE: We have not discussed it, Your Honor.

THE COURT: Okay.

MS. WAGSTAFF: Thank you, Your Honor.

THE COURT: Okay. Are we ready to call the jury back in?

MS. WAGSTAFF: We have just agreed on an objection, you will be happy to know. Let me just let my tech person know something I want to redact. If you can just indulge me for just a second.

THE COURT: Okay. How long will that take? Can we start bringing the jury in?

MS. WAGSTAFF: Yes.

(Proceedings were heard in the presence of the jury:)

THE COURT: Welcome back. You can resume with Dr. Ritz.

BY MS. WAGSTAFF

Q. Good afternoon, Dr. Ritz.

A. Good afternoon.

Q. I hope you had some time to get some food.

So we spent the morning with you -- do you need any water?

A. It's fine.

Q. Okay. We spent the morning with you going over your qualifications and talking about your journal publications and sort of describing what a medical literature is. So before we get into the nuts and bolts of your actual decision, I would like to say prior to coming to trial today, explain to the jury -- ladies and gentlemen of the jury, what you reviewed in forming your opinion in this case.

A. Right. So I did what I usually do. When I have to form an opinion, I go to the literature. I read what is there. Peer-reviewed literature, the papers that we will talk about, but I usually also go a little broader than the epidemiology literature, which is where I'm the expert.

I also like to read something about animal studies because I'm a medical doctor. I'm a scientist. I work with people who do animal studies, so I want to know what our little furry friends tell us, right, because we test on them a lot of things; and I also try to form an opinion whether there is a biological way that actually all of this could happen. And that's what we call mechanistic data or toxicologic data; that is it actually possible, is there enough getting into the body, what is the body doing with the chemical, where does it end up, what organ does it damage. So I have done all of that.

And then, of course, I also read the reports by the EPA,

the Environmental Protection Agency. I read the reports by the International Agency on Research of Cancer and all of those also formed opinions, but really my -- my -- I have to say I like to form my own opinion. So I really have to go and make myself comfortable with what is out there to form that opinion, and that's what I did. I did everything so I'm comfortable with my opinion as a scientist.

Q. All right. I didn't mean to cut you off.

A. Sorry.

Q. So based on your review of the epidemiological literature, the animal literature and the cell data studies and your experience in education as an environmental epidemiologist, have you formed an opinion within a reasonable degree of medical certainty whether or not Roundup is capable of causing NHL?

A. Yes, I do.

Q. And what -- can you tell the ladies and gentlemen of the jury what opinion it is that you hold?

A. Well, I absolutely think that Roundup is capable of causing NHL in humans in the way it has been used.

Q. All right. Excellent.

So now, I would like to get actually to the nuts and bolts of your opinion. So please tell the ladies and gentlemen of the jury what a risk factor is.

A. So a risk factor --

Q. Risk ratio, sorry.

A. Risk ratio, good.

These risk ratios, you will see a lot of, and my students hate them too. But they are making our lives easier because once you understand what they are saying, it is actually -- it gives you a very good idea of what is going on in a study, and it is what I tried to explain this morning, where you have the group of people that was exposed to something, and then you are seeing who comes down with cancer and what is the number among everybody exposed, how many come down with a cancer? That is a ratio, but not yet a risk ratio. That is a risk -- a ratio measure.

Let's say ten out of a thousand workers come down with that disease, and then you have another thousand workers you also look at, and they have not been exposed to this chemical. And among them you count five, right, five cases. So you have ten over a thousand, and then divided by five over a thousand. So that's ten over five, gives you two. That is a risk ratio. Basically that's all we do.

In studies where it is an odds ratio, it is a little more complicated because we are starting with cases and then we are starting with non-cases, and then we look how much exposure was the cases and how much exposure was there non-cases and was there more exposure; but it is the same kind of ratio.

So in the end, these ratios tell us, yes, the cases were

more exposed than the non-cases, or among the non-exposed -- among the exposed, there is more cancer than in the exposed. Since it is a ratio measure, you can tell 10 over 5 is 2. That's bigger than one. If the number of cases will be the same, you would get 10 over 10. That's a 1.

So when we talk about null effects, it is actually not null because it is a ratio. It has to be 1. So we are always very concerned about that number being greater than 1 because it indicates there are more cases in the exposed than the unexposed. Okay.

If that ratio measure goes below 1, do you now have an intuition of what happens? What happens is you have less people among the exposed than the unexposed; right? That is the only way how that ratio can go below 1.

That means what you are giving these people is actually helpful. It protects them from cancer because the ones who didn't get it have more. So when we see an estimate -- we call it an estimate -- fall below 1, then we think it is protected. So if we have a toxin we are evaluating, then we have to be worried about is that really true? Can that be, that a toxin prevents cancer; right?

And that's constantly the kind of question that you have to carry around when you see all these estimates, these ratios above 1. Then all of them tell you, okay, there is a greater risk. If they all kind of fall around the 1, then maybe there

is a random fluctuation, but generally that is no effect; right? But if they all fall or most of them fall below the 1, then there is protection.

If you really don't think that agent can protect you, something must be wrong with what you are doing. Maybe you have been miscoding; right? That is the first thing I ask my students. Did you code this right? Did you reverse the exposure, the coding for exposure that you call the exposed/unexposed, and the other way around? It happens. Believe me it happens. This is how we evaluate in these scientific studies what causes cancer, what causes disease, underexposure compared to not being exposed.

Q. All right. And is there a significant risk ratio?

A. Yeah. There is a principle in statistical science that is called significance testing or significance of an estimate. So these risk ratios I just described, they are called estimates. And as I told you, you can have all these estimates on one side, on the other side; right? You can also have them fluctuate around the null, which is one. And when they start fluctuating around, that gives you a hint, hmm, one study is above; one is below. What is wrong?

And what often is wrong is the study was so small that adding one case or subtracting another from one of the other group makes these ratios flip.

So in essence significance helps us evaluate how much

random fluctuation is there between -- when I come up with these estimates. When I calculate this ratio, how much would there be randomness that generated this one estimate, and how certain can I be that that estimate is really what -- what I should take for the truth, or maybe that estimate should be closer to the 1 or further away from the 1. But it is random because, you know, something happened that I didn't find one case. Something happened that somebody miscoded an exposure. And these things happen. We are all human. We are all doing real-world studies in real human beings, so mistakes happen; right? Random mistakes is what we are trying to guard ourselves against by saying absolutely. This is a 20 percent or a twofold risk increase. No. We are putting these bounds around it and saying in this range the estimate must be.

Q. Okay. And is statistical significance the only way to consider whether or not chance played a role in the risk ratio?

A. Actually, it is absolutely not the only way; and it is probably the worst way you can look at it because the statistical significance testing just asks you does -- can chance be completely eliminated or not, according to the rule that I set up, which is usually a 5 percent of the testing rule, and that's an arbitrary rule.

And it is also a rule that may or may not help you because you are not trying to make a decision whether there is a yes/no answer in one study. What you are trying to figure out is what

is the information in my study telling me overall. So -- and there is a lot more information and data that significance testing would ever allow you to use. So I like to tell my students we need to use all the information we have. Significance testing is out. We are looking at all of the data. We are looking at what is called a confidence interval.

So that confidence interval --

Q. Let me stop you right there because I would like you to turn to page -- binder 892, which -- I should have a binder for you.

A. 892?

Q. Can you please tell us -- it is double sided. It is two pages. If you can please tell us what this is and whether or not it would be helpful in explaining your opinion on confidence intervals to the jury.

THE COURT: Here it is. It is out of order.

MS. WAGSTAFF: It is out of order.

THE COURT: It is after 903.

A. Which one are we looking at?

BY MS. WAGSTAFF

Q. 892. If you can please tell the Court what those --

A. These?

Q. Yeah, just what those are. And if it would be helpful for you to show those to the jury to explain your opinion.

A. Yes. This is just a visual representation of what I just

waved my hands --

THE COURT: I think Ms. Wagstaff will publish that to the jury, so --

THE WITNESS: Yes.

THE COURT: -- you don't need to hold that up to them. You can just describe it.

THE WITNESS: Okay.

MS. WAGSTAFF: Permission to publish, Your Honor.

MS. MATTHEWS: No objection.

THE COURT: All right. Go ahead.

BY MS. WAGSTAFF

Q. Let's start with the first page -- who is controlling this -- thank you.

A. So this is a simple graphic. You see my red line is what we call a null effect, the 1; right? The number of cases in the exposed is exactly the same as the number of cases in the unexposed, and this shows 1. That is the one line.

And then you conduct a study and you find well, my relative risk is actually 1.5. You say 1.5 is above 1, so there is a 50 percent increase in cases. So instead of 10 in the unexposed, I have 15 in the exposed. That's how I get my 1.5. 15 divided by 10; right? I get the 1.5. Okay. I know now there is a 50 percent increase in cancer risk.

Well, not so fast because we also know that a small study might find this 15 over 10; but if I had had a bigger study,

and I could have looked at 150 exposed over -- or found 150 exposed cases over 100 unexposed, then actually I would be more certain that there is a 50 percent increase. And if I had 1,500 and a thousand, I would be even more certain.

So with every increase in my numbers of exposed cases over unexposed, my confidence increases that I have the right estimate, right; that it is not just one case that flip-flopped where I made a mistake, where somebody entered the wrong data. So in order for us to visualize what my data came from, that 1.5, whether it is 15 over 10 or 1,500 over a thousand, right, we are putting these confidence intervals around the 1 -- around the estimate.

So this represents how much information we have in the study to rule out random error and nothing else, only random error. Making a mistake randomly, not systematically. Randomly.

So what it shows is that most of my information tells me it should be a 1.5, but you see that this little bell curve there -- that is the density of information, how much information I have -- it goes -- that lower ends goes across the 1. So there is a slight chance that actually the true estimate -- if I would repeat the study over and over again -- would be below 1; but there is only a 2.5 percent chance that that would ever happen, okay.

However, if I asked my students is this a statistically

significant result, well, in 97.5 percent of the time if I repeated this, I would get an estimate above 1, but in 2.5 percent of the time I wouldn't. So statistically speaking it is not significant although most of the information tells me there should be an effect, but my study wasn't big enough. Sorry.

So according to the rules of statistical significance testing, I'm not allowed to say it is statistically significant. That doesn't mean it is not medically significant. It is significant in any other ways. It is just not statistically significant according to those rules.

So what represents what I said much better are these whiskers. You have the dot in the middle, and you have the whiskers, and you can see how far these whiskers go out and whether they cross the red line. And if they cross the red line, you now know it is not statistically significant; but it doesn't mean there is no effect. That's all.

Q. All right. Have you taught this concept of using confidence intervals to help you rule out chance to your students at UCLA?

A. Absolutely.

Q. If you can turn to binder Number 908 -- and I -- is this a -- is this a chart that came out of peer-reviewed literature?

A. The chart -- the chart -- I made up the slide, but the chart on it comes from the peer-reviewed literature, yes.

Q. Okay. And the -- if you will turn to page -- to binder Number 912, which is the Stang article?

A. Right.

Q. Is this is the article where this chart came from?

A. Yes.

Q. Is this an accurate representation of that article in this chart?

A. Yes.

Q. And will using this chart help you explain your opinion to the jury?

A. Yes.

MS. WAGSTAFF: Permission to publish to the jury.

MS. MATTHEWS: No objection.

BY MS. WAGSTAFF

Q. If I could ask, will it help for you to come down and write on this board?

A. Probably, yeah.

MS. WAGSTAFF: Permission, Your Honor.

THE COURT: Yes.

Dr. Ritz, make sure to speak up because the court reporter needs to get your voice.

THE WITNESS: So this is actually a slide I have used in my classroom a few weeks ago. I really apologize to you that I spring this on you without all the other stuff that comes before.

When I show it to my students, it is a slide show so this doesn't appear yet. All they see is this side of the slide, and the title which says "The Ongoing Tyranny of Statistical Significance Testing in Biomedical Research," and it is published by colleagues that I know quite well including Charlie Poole, who is a very well-respected methodologist and has been writing about this his whole career.

So what they are trying to say is we should not just use one tool. When we have a nail, you know, we need a hammer, but we can also -- there are many kinds of hammers and many kinds of tools, and statistical significance testing is just one who wants to encourage students to do more, right, to be better, to involve all the information that we can gain into their decision-making.

So if I -- when I show this to my students, I show them this slide first and you see here it says -- my line isn't in red, but that should be the red line; right? Then we have this dot. That is my point estimate. It says incidence break ratio. It is a ratio measure. It is twofold, meaning we had 10 over 5 subjects in the exposed over the unexposed that came down with the disease. That's what that says. I have my 2 here.

Then I have told you we have a confidence interval. How confident am I that this is a twofold increase and not just random because, you know, I miscounted, make mistakes,

whatever. So here is my confidence interval. It goes from .9 to 4.2. That is pretty wide; right? And that's reflected in here. And most important for the people who love statistical significance testing, it crosses the magic line of 1.

It doesn't cross it too much. It ends up here, given that it could go all the way to null; right? But it goes from .9 to 4.2. And I could say, Well, it might be a twofold risk increase, but there is uncertainty. There is random error, and I can truly not tell whether that study should be taken serious; right? Maybe it was just too small and too much random error. They didn't measure well enough. That is another way of getting random error. They didn't measure right. They didn't measure the exposure right or the disease right and everything. So there was a mistake.

I would stay at this and then say -- in most studies when I write papers, I would say, This is an indication that possibly something is wrong, but now I have to achieve -- actually go to work. I need a larger study or I need other studies to convince myself there is something; I'm not right. Then I'm showing this.

This says prior studies. I didn't have to go out there and do more studies. All I had to do was actually read the literature, which I tell my students before you say, I'm going to go get something for the next study, go and read the literature.

So this person now read the literature and found studies that actually assessed the same association, pesticides and NHL, smoking and lung cancer, whatever it is; right? And these are all the prior studies, and they came up with different estimates. Not one of them really came up with exactly the same point estimate.

So their risk ratio is from this largest one, probably 3.2 to down there, very close to 1; right? And if you had only done this study, I would have said there is nothing. If you had only done this study, everybody would have agreed this is statistically significant because this is above 1. This is a big effect. It is almost fourfold; right? Haha, there is something there.

Do you see now how you have to put things in context? You now have one, two, three, four, five, six, seven, eight, nine studies; and then you have your little study here with the 2. And now you are doing something in your head already that people, scientists, have to do. They have to go beyond what they can do themselves and put it in the context of the literature and what we already know.

And when I show this to my student and say, Do you believe this twofold now more or less? I think all these dots are above 1. There are some studies that don't have enough information to say it is statistically significant. It is this study, this study, this study. These do, but then overall,

look at the pattern; right? It is all above 1.

So, overall, if I were to put all of this information together -- and that's what we call a meta-analysis or a pooled analysis -- I pool all the information of these studies -- and then I probably would get a nice estimate somewhere in between all of these, and that estimate would be fairly close to 2, and that prior knowledge -- we call this prior knowledge from what has already been done in the literature, et cetera -- would then give me a idea of how to interpret this estimate. And I would not go and say, Oh, you know, we see something but there is probably nothing because it is not statistically significant.

No. I would say, My little study here confirms what other studies have shown, and actually adds to the amount of information we now have out there, right?

We now have a lot more information than any one of these studies could have given me. I would not have been certain with this study or with this study or with this study. What we do is we put them all together and say in the context of all of what we have done, Do I believe that estimate is above 1 and it is not just chance that did it.

BY MS. WAGSTAFF

Q. Thank you. You can have a seat.

Dr. Ritz, can you explain to the ladies and gentlemen of the jury, please, a difference between a never-ever analysis

and a dose response analysis, to include the strengths and weaknesses of both, please?

A. Right. So when I do my exposure assessment, which is what -- you know, the most important part of my work, we want to know not only have you ever used this agent, but we want to know when have you used it, how much have you used it, for how many years have you used it, how have you used it, did you protect yourself while you have been using it, did you spill the stuff on you, were you given bathroom access like the workers in the Central Valley to wash the stuff off if you spilled it? What happened; right?

And all of that information then goes into how much I think that person actually got exposed. And if you don't do that, you would be doing something like you ask a smoker, Are you a smoker? And he says, Yes and that's it. He is a smoker.

But you could also say, Well, how many cigarettes have you ever smoked? And the answer could be, You know, when I went into the military, I tried it for a month, and, you know, it didn't become me and then I stopped. But the question, Have you ever smoked, would have been yes. So you classify somebody who smoked -- tried smoking for a month as a smoker.

And then you have your neighbor who you have seen smoking every single day on the balcony.

THE COURT: Dr. Ritz, there is an objection.

MS. MATTHEWS: Objection based on prior rules.

THE COURT: Overruled.

THE WITNESS: So you have your neighbor and you ask him the same question, Have you ever smoked? And he said, Yeah, and you leave it at that and you call him a smoker.

Then you ask yet another person whether or not they ever smoked. You would not know whether that person has stopped smoking when they were pregnant, smoked maybe one cigarette a day, or tried to keep it within five cigarettes a day, or has actually a three-pack habit that he sustained for 40 years; right? It is that simple.

So when you say never-ever, you are saying a smoker is a smoker is a smoker no matter what they answer to how much, how often, how long have you done this. So dose response actually -- my colleagues who do -- who did the early smoking studies were really smarter the way they did it. They asked all these questions.

They didn't just say, Well, are you a smoker or not? They asked all the questions I just told you. And then they said, How can we summarize this? And they came up with something called "pack years."

So they asked people, How many packs a day do you smoke? And then, How many years have you smoked? And then they multiply that and you get a pack year. So you have a lifetime pack year exposure, and then they look at, Okay. If I have 5 pack years, 10 pack years, 20 pack years, 40 pack years, what

is the risk of lung cancer?

And the general rule is that if you see that the risk increases with dose -- and what I just told you, the pack years are considered a dose -- then you believe that there is probably a higher chance that what you are seeing is not random, is not just, you know, some mistake, because with dose comes the poison; right? The more you get, the more -- the higher your risk is that you actually come down with the disease. And that's what we call a dose response. And whenever we can, we actually do that.

Whenever we have the information, we are trying to tease out what is the dose. And when we can't do that, we at least are trying to figure out who is the most highly exposed, and who is just an occasional user who maybe I should call unexposed or treat like the people who never touched a cigarette, right, because they are closer to them than to the people who used a lot.

BY MS. WAGSTAFF

Q. All right. Thank you.

If you can turn to Exhibit Tab 904, please, in your binder. Tell me when you are there.

A. Yes.

Q. Dr. Ritz, did you participate in making this chart?

A. Yes.

Q. All right. Dr. Ritz, is this a chart that summarizes some

of the epidemiological literature that you reviewed in forming your opinion in this case?

A. Yes, it does.

Q. Dr. Ritz, would it be helpful for you to show the jury this demonstrative in expressing your opinion to them?

A. Yes.

MS. WAGSTAFF: Permission to publish.

MS. MATTHEWS: No objection.

THE COURT: Go ahead.

MS. WAGSTAFF: I actually have a demonstrative, Your Honor. May I publish the demonstrative?

THE COURT: Of course. You mean it is the replication of this?

MS. WAGSTAFF: It is a complete replication. However, I'm going to write on this one.

BY MS. WAGSTAFF

Q. Dr. Ritz, could you please explain to the ladies and gentlemen of the jury the categories of -- just orient them to this chart to include what the names in parentheses are, what the type means, the size and the exposed cases, if you can orient them, please.

A. Yes. So this is a complicated chart that will give us a little bit of an inside overview of the human data from what we call the epidemiologic studies -- so those are the studies that I do -- have provided to us. And under study you see where the

study was done, like in Sweden or in Canada; who conducted the study. That is in brackets. You see *Hardell* et al. That is the name of the first author, and the et al. tells you there is more than one author. You know, there is usually a list. And then the year the study was published.

Then under Type you see what kind of study design we call that was used, and there are mainly two study designs. One is where it start from the cases, and I select non-cases from the population; and I ask them all these questions about exposure. So we are going from somebody who is diagnosed backwards in time asking about exposures, and we are doing that also for people who didn't get the disease; and then we compare what the exposures were in those who did and didn't get the disease in order to find that bad actor, right, whatever gave up group of people, that group of people who became cases, the disease. So that is called a case control study, and that's what is listed mostly on there.

And we also call them population based. That means they are -- every case that occurred in a whole geographic area. So, for example, in all of Sweden or in providences of Sweden or in Canada. And then the size -- under Size you see the number of cases they identified. So in this case, it would all be NHL cases; right?

And then under -- the next number refers to the controls. So we have control subjects meaning the people who did not get

the disease.

And then we have Findings and you see nothing. There is nothing there yet. So we will walk you through what the findings are.

And what is also important in all of these studies is not only how many cases do we have, but how many exposed cases do we have; so how many people actually had the exposure that we are interested in identifying, in this case glyphosate or glyphosate-based compounds.

Q. All right. And I think you mentioned that this table of literature refers to epidemiological literature that has Roundup and non-Hodgkin's lymphoma; is that right?

A. Right.

Q. All right.

A. Uh-huh.

Q. So I probably should have put this on there, but let's just make that clear.

Okay. So let's just walk through each of these briefly. If you could turn to Binder Number 443.

And, Mr. Wolf, if you could pull up the Hardell 1993, 443, please.

And, Dr. Ritz, if you could tell the jury, please give a little bit of context and background about the Hardell case.

A. Right. So here we have that Swedish study by two authors, Lennart Hardell and Mikael Eriksson, who used the resources of

the Swedish Public Health System, which includes a Cancer Registry, to identify cases of non-Hodgkin's lymphoma in Northern Sweden.

And Northern Sweden is very woodsy and they are using in forestry and in agriculture herbicides, and one of the herbicides was a Roundup-like product.

And what they did is they identified all of these non-Hodgkin's lymphomas. As soon as they're diagnosed, they get into that registry, and that's like the California Cancer Registry, only the Swedes had it for longer.

And so for a certain amount of years in the end '80s, early '90s, he identified these 400 cases; and then since in Sweden they also have a population register, meaning every resident is registered in the system, they can randomly select from that registry noncases of the same age, the same sex, who live in the same province, and that's what they did.

And then they went out and asked them all these questions about: Who are you? What have you done in your life? You know, what kind of jobs did you have? What kind of chemicals did you use?

And this is -- Northern Sweden is very rural. If you know Sweden, the major cities it's Stockholm and then in the south, so this is really rural Sweden.

Q. Okay. And, Mr. Wolf, if you could pull up Table 1 and please highlight the row related to glyphosate.

And, Dr. Ritz, just to confirm, you relied on all of these studies in forming your opinion; correct?

A. Yes.

Q. Okay. So let's just go through the findings. And if you could please just tell me the risk ratio and the confidence interval, please.

A. So here we have a table that looks at the herbicide use, the insecticide, and fungicide use, but for us of interest it's glyphosate. So we can highlight glyphosate and we get the number of exposed cases and controls, and we get -- and then, you know, we go through our mass here and we get our odds ratio/risk ratio of 2.3. So that's like that ratio measure that gives you 2.3.

But as I told you, don't take that at face value. You want to know more. You want to know these whiskers; right? How wide are they? Is this just random? Especially since it's only four exposed cases.

So your intuition probably tells you it should be wide, you're right. It's wide. It's .42 -- and now I can't read it. 9.9?

Q. .4 to what?

A. I think it's 9.9, but I can't read it really well. Let me go to this.

(Witness examines document.) Oh, boy. It's as bad in here. I think it's 9.9.

Q. Okay. We'll put 9.9 question mark.

All right. And the jury heard a little bit about adjusted and unadjusted risk factors in the opening statements.

A. Right.

Q. And so I'd like you to please explain if these numbers -- if this 2.3 risk ratio was adjusted or unadjusted and what that means, and then I'll ask you to tell the significance of that on your opinion.

A. Yes. So so far all we have done is worry about random error, but there's something that actually is just as bad and that's called systematic error. So -- and it is what the word says. It has a system to it, meaning it draws that estimate to one or the other side. It's systematically overestimating or underestimating.

And the way that works is it generates a bias, and we have factors that may generate these biases and we need to concern ourselves with this bias.

This morning I told you we can't go back in time. Instead, what we're doing is trying to find a group of people who is as similar to the people who are exposed except for the exposure. Right?

But we have to check whether that's actually the case or were they actually dissimilar in terms of other things. "Dissimilar" meaning are they all older than the people who were exposed? Am I comparing women to men? And there might be

a difference in disease risk in women and men. Are they of different races, of different ethnicities and, therefore, they have a different chance of getting sick? Right? Or have they done different jobs that also expose them to something else?

So what we're most worried about are usually these factors, like, sex and race and ethnicity; and in Sweden they didn't have to worry about ethnicity. In the northern Swedish parts, they are all pretty white so they didn't worry about that; but they definitely matched, which means made the comparison group as similar as they could in terms of sex and age.

So that is actually adjusted for. "Adjustment" means nothing but making similar and making sure that the comparison group is actually similar to the group that you want to say something about, which are the people who have the exposure. Right?

So that estimate we call unadjusted but only unadjusted for having used a different type of pesticide. Okay? They are adjusted for other risk factors, such as sex and age. But let's call it unadjusted.

Q. Okay. And, Dr. Ritz, I had my tech guy pull up the cleaner copy of this, and would you agree or would you have any reason to disagree that the outer boundaries are 13?

MS. MATTHEWS JOHNSON: Objection.

THE COURT: Sustained.

MS. WAGSTAFF: Okay. All right.

Q. Well, we'll just leave your 9.9 then.

A. I didn't bring my glasses.

Q. Okay. So you said this was unadjusted. Is this the only --

THE COURT: So you can disregard that prior question because I sustained the objection, Dr. Ritz.

BY MS. WAGSTAFF:

Q. Yeah. Right. That means -- okay.

A. (Witness examines document.) Yeah, I can't see it.

Q. Okay.

THE COURT: That's okay. I sustained the objection so you can disregard the question. Wait for the next one.

THE WITNESS: Yes. Okay.

BY MS. WAGSTAFF:

Q. So is this the only data that you were able to pull out of the Hardell 1999 study?

A. No. Actually they did go ahead and said: Well, you know, we don't have many exposed -- glyphosate-exposed cases and they did that also for other pesticides but, you know, since people are using multiple pesticides, and in 1999 when this was published we aren't really sure which pesticide might be causing the cancer so we should probably make sure that the un -- what we call unexposed group is really comparable also with respect to having not other types of exposure.

So the people you call exposed to glyphosate and compare them to those not exposed to glyphosate, could it be that everybody who was not exposed to glyphosate is actually using 2,4-D? And if they are, could 2,4-D then have given them the cancer?

And that would mean I wouldn't see anything; right? I wouldn't see an effect because I'm now comparing exposed to exposed only it's two different pesticides; right?

And we're worried about that. We're also worried about something like, okay, I call these people exposed to glyphosate but maybe they also were exposed to 2,4-D, and I compare them to the unexposed and they were all really unexposed. Neither 2,4-D nor glyphosate; right?

So my 2.3 risk ratio there tells me not just something about glyphosate, it tells me something about glyphosate and 2,4-D because these people were co-exposed. They had all the exposures; right? So I shouldn't be saying it's glyphosate. It could be glyphosate and 2,4-D or 2,4-D. I just can't say; right?

So in order to come up with an opinion about that, I'm now adjusting for other pesticides, meaning I'm generating a statistical model where I put the information about whether or not these people also used other pesticides into that model, and that's what we are calling adjusting. Okay?

And when they adjust it, and they tell you that in the

text on page 1357, they generated an odds ratio of 5.8 with a confidence interval of .6 to 54. You can see how our confidence interval completely exploded; right? It's much wider now. That's what we expect. Unfortunately, that's what happens. The more factors you are trying to take into account in your modeling, the more you are widening the possible random error; the possibility that, you know, something went wrong and estimates might be not as stable. We call it not as stable.

But what you also see here, that adjusting for other pesticides, that estimate went from 2.3 to 5.8. That's an element sixfold risk increase. But I would not tell you to take this study serious and say glyphosate will cause a sixfold increase in NHL because of that large confidence interval and the small number of cases they were able to use.

Q. And, Dr. Ritz, what does this "NR" mean?

A. That means that they didn't tell me in the text where they told me what the odds ratio is how many cases were in that analysis that were exposed, but I presume that they had all four cases in there.

Q. Okay. And you just gave the jury a description of what a confounder is and described how to adjust for a confounder.

A. Right.

Q. How do you know if something is a confounder that you should adjust for?

A. Right. So at the very beginning of the game when we're

trying to figure out what is what and what causes cancer and what doesn't -- so find the bad actor; right? -- unless you think everything causes cancer -- we don't think that -- you actually have a very hard time identifying whether or not you should believe the estimate 2.3 or the estimate 5.8.

And the reason for that is that this systematic bias where the estimate is drawn to one side or the other side of the null, the 1, has rules to it, and the rules are that factor that is a systematically biasing factor actually has to be a risk factor for the outcome, has to be a risk factor for NHL.

If I don't know whether pesticides are a risk factor for NHL, how would I know that? Right? So what we are doing is playing these games putting adjusting and not adjusting and saying, "Hmm, what's happening if I do?" But honestly that's playing a game. What you really want to know is: Is this other pesticide a *bone fide* carcinogen? Then I worry about it.

I know that age is a risk factor for the outcome. I know that when I look at lung cancer, smoking is a risk factor for the outcome. In a lung cancer study, I want to adjust for smoking; right? It's a risk factor for the outcome.

But here very little is known about these insecticides and pesticides. We are in 1999. Not many studies have been done. Almost none; right? So we're just guessing. We are guessing, "Oh, maybe I should put 2,4-D in the model. Oh, maybe I should put Dicamba in the model. Oh, maybe I should put creosote in

the model." Right?

But we don't really know whether that's a good idea or not because we have no determination that that agent that I'm also throwing into my model should be thrown in because I may actually generate bias instead of taking it out.

And so between the 2.3 and the 5.8, I don't know which is the truth, I really don't, because we at this point in time of Hardell, if it's not a risk factor for NHL, it should have been kept out of the model. That's what I know; right?

Q. All right. And is this the end of the Hardell story?

A. No. They actually realized that they did not have enough data to say anything about most of the pesticides they were interested in, though they said, "Well, let's do a little bit of what I explained to you before, do a better job and do a better -- a larger study." So they were actually able to add cases and also noncases, controls, into their study; and they then published those results in 2002, I guess. Right? I lost my --

Q. And, Dr. Ritz, can I hand you this copy? I just want to go back to the previous study. It's a more legible copy.

I can show counsel if you'd like to take a look at this. I'm just going to show her a more legible copy.

You were saying that you had a hard time with the 9.9 so --

A. Oh, yes. Let me see.

Q. -- the outer bound.

A. It was actually 13.

Q. 13. Okay.

A. Yeah.

Q. So maybe on a break I'll change that 9.9 to a 13.

A. Yes.

Q. I was starting to smudge it a bit.

All right. So if you could publish, please, Mr. Wolf, the Hardell 2002, which is Binder Number 499; and if you could pull up, Mr. Wolf, Table 1, please.

And, Dr. Ritz, if you could explain the second part of Hardell to the jury, please.

A. So this is the same group of authors. They were a little disappointed that their study wasn't more informative. They added cases and they added controls, and by doing so they are increasing their statistical power; right? So they now have more cases; and not only do they have more cases, but they also have more exposed cases. So they're pretty much in this case doubling the number of exposed cases to eight.

Q. Okay. And let's talk about what the Hardell-2 found. If you could look at Table 1.

Yes, Mr. Wolf, if you could highlight the glyphosate.

And please explain to the jury what the Hardell-2 found.

A. So here we now have eight glyphosate-exposed cases. That risk ratio is 3.04. So right between those two estimates I

showed you before, right between 2.3 and 5.8, and look the magic. I did what I said we need to do to make something statistically significant; right? It happened. So our confidence interval is now 1.08 to 8.52.

Q. Okay. And are these numbers adjusted or unadjusted for other pesticides?

A. They're not adjusted for other pesticides.

Q. Okay. And did Hardell-2 give us any other data?

A. So the first thing I want to say here, this is a trick where you would say -- where people who only use statistical testing would say the first study is a null study, meaning there's no significance in glyphosate causing NHL. All we have done is add cases and controls in the second study, and we get exactly the same -- a similar effect size, 3 instead of 2.3 or 5.8; but because those whiskers shortened -- right? -- they pulled in, they pulled across the 1, which is even more important, they now can claim we have a statistically significant result for glyphosate causing NHL.

I think both studies tell the same story. It's just that in the first study you couldn't completely rule out random error. Okay?

Q. All right. If you could pull up Table 7, please, Mr. Wolf.

And we're introducing yet another set of terms here, the univariate and the multivariate. Can you please explain to the

jury what those mean?

A. So that's just a different term for saying I'm adjusting. Univariate means I only have one pesticide in the model; multi, multiple, I have multiple pesticides in the model. So the multivariate model actually throws then these other pesticides that people may have been exposed to into the model. So it's an adjusted estimate.

Q. All right. And can you tell me what the adjusted numbers were, please, for Hardell-2?

A. They are 1.85 with a confidence interval of .55 to 6.2 and that's adjusted.

Q. Okay. And was there another set of numbers from Hardell or --

A. No. That's pretty much it.

Q. Okay.

A. So what happened here -- different from the first Hardell, we're actually throwing in other pesticides -- increased my estimate to 5.8. Now throwing in other pesticides, co-exposures to other pesticides reduced my estimate from 3 to 1.85.

However, when you look at the pattern of all the estimates, it tells you there's an 85 percent to sixfold increase in risk depending on what estimate you want to believe. However, you can see that the 1.85 now, the whiskers, are broader again and they're crossing the 1.

So, again, our adjusted estimate has added random error. It doesn't tell you about bias. It just tells you there's more random error. And as I told you, that happens every time you throw another variable into a model. You're generating more random error so these whiskers go out again. And in this case they crossed the 1; right?

So somebody who believes in statistical testing would say, "Ha, you adjusted for other pesticides, you have a null result. There's nothing there."

Well, if you look at the effect estimate, it's 1.85. That's pretty impressive still. That's 85 percent risk increase. And in the context of everything I know about this study, that's not the same as saying the estimate is 1; right?

Q. Okay. Let's go back, then. Let's skip back up to McDuffie.

So is this the end of the Hardell story?

A. Yes.

Q. Okay. So let's go back to McDuffie.

And, Mr. Wolf, if you could please publish the McDuffie study, which is Binder Number 447. And if you could please pull up Table 2.

THE COURT: Before we go to McDuffie, I think maybe this would be the time to take a five-minute afternoon break.

MS. WAGSTAFF: Sure.

THE WITNESS: Thank you.

THE COURT: Why don't we break for about five minutes. We'll resume at what is, according to that clock -- did it get switched? Did it get fixed?

THE CLERK: Not yet.

THE COURT: So five minutes to -- we'll resume at five minutes to 2:00 --

MS. WAGSTAFF: Great.

THE COURT: -- which I think on your clock is --

MS. WAGSTAFF: I'm not leaving.

THE COURT: -- ten minutes to 2:00 or 2:00. I can't remember. Ten minutes to 2:00. No. 2:00. We'll resume at 2:00 according to your phones, and we will get that clock fixed by tomorrow.

(Proceedings were heard out of the presence of the jury:)

THE COURT: I'm totally confused about what time it is but, anyway, I'll see you in five minutes.

MS. WAGSTAFF: Okay. Thank you, Your Honor.

THE CLERK: Court is in recess.

(Recess taken at 1:51 p.m.)

(Proceedings resumed at 1:59 p.m.)

(Proceedings were heard in the presence of the jury:)

THE COURT: Okay. You can resume.

BY MS. WAGSTAFF:

Q. All right. Dr. Ritz, pursuant to my questions about -- oh, wow. This is a little -- sorry for turning my back on you

when I'm writing. This is a little harder than I thought, but I was going to change the 9.9 --

THE CLERK: Hold on. Stop. Timeout. We're missing somebody.

THE COURT: We're missing a juror.

MS. WAGSTAFF: Good catch. I'll just keep erasing.

(Pause in proceedings.)

THE COURT: I'm pretty confident that was my fault. Sorry about that.

Okay. You can resume.

BY MS. WAGSTAFF:

Q. All right. Dr. Ritz, prior to our break, I had showed you a new copy or a cleaner copy of the Hardell, and you had realized that it was actually 13 instead of 9.9.

A. Correct.

Q. So I did my best to erase that, and I'm going to fill it in with 13. And that was unadjusted; correct?

A. (Nods head.)

Q. Okay. I just wanted to have accurate numbers on there.

All right. So now if we could turn to the McDuffie study.

A. Yeah. So McDuffie, Helene.

MS. WAGSTAFF: Can we publish that, please, Ms. Melen?

THE CLERK: Yes.

MS. WAGSTAFF: Mr. Wolf?

All right. And if we could pull up Table 2.

Q. Okay. Doctor, sorry.

A. Yeah. So this is a Canadian study, and it's conducted by the Agricultural Medicine Center of Saskatchewan together with the Canadian National Cancer Institute. So these folks were interested, as we are, in finding out whether in agriculture the exposures such as pesticides that may be causing cancer.

So they do the same thing as our Swedish colleagues did. They used the Canadian Cancer Registry, and they pull out -- how many? I can't see it now -- 500 and -- no. How many cases? 515? I don't have my slide up.

Q. Dr. Ritz, this chart is Number 903 in your binder. If you want to pull that out so you can --

A. Yes, that's good.

Q. As you're flipping the cases, that may help. If you just unclip your binder and pull out 904.

A. Oh, yes.

So in Canada we have now 517 cases assembled in the same way as the Swedes did, but they have 1500 control subjects, meaning people who don't have NHL. So all 517 cases have NHL.

And they were drawn from actually six provinces in Canada, and they were mostly agricultural provinces. They didn't want the big metropolitan centers, and most of these people turned out to be -- almost half of them turned out to be farmers all been living on farms. So we have a heavily farming population again just like in Sweden where we had Northern Sweden, which

was mostly farming.

And they also conducted what's called a population-based study because not only could they find the cancer cases in the registry, they could also then go to population registries in Canada and identify people of the same age and the same provinces, the same sex, and then approach them and say, "Would you mind being part of a cancer study?" That's how they do it. And 1506 were enrolled and gave them that information.

Q. Okay. So there were two types of analyses done in McDuffie; right?

A. Uh-huh.

Q. Okay. Let's talk about the one that yielded 51 non-Hodgkin's lymphoma cases. Can you tell us -- can you tell the jury, please, the results from that study and what that was?

A. Right. So we have Table Number 2 here and they are showing us all of the results that they got for asking about different herbicides, and one of the herbicides they asked about was actually glyphosate and in brackets they say it's Roundup, and there are 51 exposed subjects. So many more than we had in Sweden. Meaning in Canada that use was much more widespread.

And they compare it to the number of people -- the percent of people among the controls, and you can see that their relative risk odds ratio that you see under -- is it being

highlighted now? -- the A one and the B one is 1.26 and 1.2 and we're using the 1.2 because that's the one that has more adjustments. Meaning the first one was just adjusted for age and sex and province of residence, and then the second one they also put a lot of medical risk factors and family risk factors into the model.

So they're co-adjusting for family risk factors and medical risk factors such as different viral infections, et cetera, but they're not co-adjusting for pesticides. Right? They're just doing one pesticide at a time here. That's why we still call this unadjusted.

And in this case the estimate is 1.2, which tells us 20 percent increase of NHL among those who were exposed to glyphosate. And our whiskers, we draw them out in this confidence interval, they go across the 1; right? Not statistically significant. They go from .83 to 1.74. So we have something on the right side of the null, but we don't have a significant result.

Q. Okay. And then McDuffie broke that 51 down into two groups.

A. Right.

Q. And, Mr. Wolf, if you could turn to Table 8.

And, Dr. Ritz, if you could explain to the jury what's going on in Table 8 and the significance of the data?

A. Right. So we talked about dose-response before and

calling somebody who smoked for one month in his lifetime a smoker or calling somebody who smoked for 40 years, three packs a day, a smoker, and calling them the same, a smoker; right? And maybe that's not the right thing to do.

So in this questionnaire data that they collected, they did a similar thing. They said, "Well, have you ever used these pesticides? Yes or no." And then they went on and said, "Well, if you have used it, how many hours a day have you used it and how many days have you used it per year?" And --

MS. MATTHEWS JOHNSON: I apologize. I just have one objection for the record. I'm not sure the witness said --

THE REPORTER: I'm sorry. I can't hear you, Ms. Matthews Johnson.

MS. WAGSTAFF: She said we talked about dose.

THE WITNESS: Response.

MS. WAGSTAFF: Yeah, response.

THE WITNESS: Did I say --

THE COURT: Overruled.

BY MS. WAGSTAFF:

Q. Keep going. Sorry.

A. So basically what they're saying here is: Well, we have several categories of people in my study. Some people who clearly never touched glyphosate. Let's call them unexposed.

But now we have a group of people who said, "Yeah, I used glyphosate." But when we then went and asked them how much did

you use; how many hours a day; you know, did you use multiple days a year; then we actually have people who report, "Ah, I used it for one day or maybe two days last summer, but never again." And then people who said, "Yeah, I used it three days for the last 10 days -- years or 30 days for the last 10 years," and we are calling them all the same glyphosate exposed. That's that estimate 1.2, every glyphosate exposed. Okay?

And so they're splitting it up and they're splitting it up in a way where, you know, nobody knows. With smoking we know, okay, maybe five cigarettes a day starts being a problem. Maybe one isn't. But here we know nothing.

So we only have statistical tools, and they use a statistical tool saying, "Well, let's have -- let's form subgroups," but we need to still have people exposed in the subgroups or else, you know, we can't estimate anything when nobody's exposed, when nobody's in that group.

So what they did is they called people that said, "Yes, I used, but used no more than one or two days per year," and called them low exposed or whatever they called them, more than zero and less than or equal to two days per year. And then they estimated just in that subgroup, and that was a subgroup of 28 exposed NHL cases, and we have a 1.0 and the confidence interval is .63 to 1.57.

Q. 1.57?

A. Yes.

Q. All right.

A. Okay. And so clearly in the group of people who have very little exposure on that measure, meaning one or two days a year, that's it. There's no effect. We are hitting the 1. That's so unusual, we should send them a card. I've rarely ever seen that. So it's 1. No risk increase.

But now -- now look what happens when you're going to the people who used it more than two days a year, which could be anywhere between 3 days, 10 days, 100 days.

Q. And so, Dr. Ritz, these two estimates for the one to two days and over two days are also unadjusted for --

A. For other pesticides, yes.

Q. So I want to be clear on that.

A. So we haven't done that.

Q. All right. So please give us the data for over two days a year.

A. That's a 2.12.

Q. 2.12.

A. Right. And the confidence interval is 1.20 to 3.73. Still unadjusted for other pesticides, but it's adjusted for what I told you, which is age, sex, province, and medical risk factors. That's already a lot.

Q. All right. And is this finding statistically significant?

A. You guys would know now; right? It is because the

lower -- the lower number is above 1 --

Q. Okay.

A. -- of that confidence interval. So this is clearly statistically significant, but I don't care about that. What I care about is the pattern I see.

The pattern I see is, yeah, there's no risk increase if you use glyphosate for a day or two; but look at what happens when you're using it regularly, more than two days a year. That's where all of the risk is, and it's more than twofold and it's statistically significant but still unadjusted for other pesticides.

Q. Okay. Let's move on to the next case.

And, Mr. Wolf, if you could pull up De Roos 2003, which is 451 in your binder. And if you could go to Table 3, please.

And, Dr. Ritz, if you could tell the jury a little bit about De Roos 2003.

A. Right. So this is really a beautifully done study by a colleague who at the time was at the National Cancer Institute of the U.S., and actually I think four of the co-authors, including Dr. Blair and Cantor and Zahm, they all were at the National Cancer Institute; and this study is a compilation, a pooling of other studies, of three previous studies done in the U.S.

Because we kind of tricked you here a little bit. We started with the Swedish study, but actually the earliest

studies ever done on pesticides and cancer were in the U.S., and they were done by these colleagues and they were small studies, small. And remember the problem with small. Random error. You can't really say much. So all of them had maybe we see something but maybe we can't really base our decisions on those.

So by the time they had the third study done, this young -- this young epidemiologist came along, Anneclaire De Roos, said, "Ah, I have this beautiful data sitting out there on the computer. Why don't we pool it? Why don't we try to actually bring all this data together; and once we have brought it together see what it tells us? And that's what she did.

So she used data from Nebraska, Kansas, Minnesota, and Iowa. And guess why they did the studies there? Rural; right? Lots of rural communities, farming communities, again lots of pesticide use.

Q. All right. So why don't you tell the jury, please, what De Roos 2003 found about the glyphosate that's in Table 3?

A. Right. And so in this pooled study, they listed every pesticide that was ever looked at in one of the three studies of the four states, and in that Table 3 they published a result on glyphosate that's based on 36 exposed cases and 61 exposed controls, and that ratio measure that we always talk about is 2.1 with a confidence interval of 1.1 to 4.0. And that's

exactly the same ratio measure we've been looking at all the time here.

And here we are actually allowed to call it adjusted. We can say A. And not because it's adjusted for sex, age, and state and maybe some other factors, but because it's also adjusted for all the other pesticides, and those are 47. Okay? It's co-adjusted for every other pesticide.

And you can tell what happened here -- you can't tell because I didn't give you the original studies where they took all the data from, but in the original studies the confidence interval whiskers would have been really wide and included the 1; right? Because we weren't sure it was random error.

Here where she has a lot more cases, she has 650 cases and almost 2,000 controls, she was able to do this beautiful analysis where she threw everything and the kitchen sink, we call that, into the model and the effect for glyphosate on NHL did not go away. It's 2.1 and we would call it statistically significant.

Q. Okay. So if you could turn to -- if you could pull up actually the same study.

It looks like we have a new analysis in this case, which is the hierarchical regression versus the logistical regression. So we have two sets of data from this case.

A. Right.

Q. Was this the logistical regression?

A. Yes. And the logistical regression is the same modeling that was done in the other studies.

Q. So the logistical regression is what we have been talking about. We just have never mentioned it by name.

A. Right.

Q. Can you tell the jury what the hierarchical regression is?

A. Hierarchical regression? I told you this was a young, very ambitious researcher who came to the NCI with a lot of abilities in analysis, and she had just learned this great new tool hierarchical regression. And what that allows her to do is actually use contextual information and add it to her data.

Meaning I can now say, well, if I presume -- I'm testing 47 chemicals here. I throw them all in one model. I let the model tell me whether there's an increased risk for any one of them, but I had not made a hypothesis that one or the other should be causing NHL.

But I do know something about NHL because in the meantime, this is in 2003, there are actually all these other studies and there is an EPA evaluation, but there's not -- nothing else I think from IARC yet, but we have a little bit more of a sense which of these chemicals should actually be bad actors.

And she said, "Well, let me use what we know." Right? And how did she do that? She gave weights to these estimates that are in this table. And so the weight she gave to glyphosate was a downweighing of the evidence because no

previous studies and no evaluation had called it carcinogen.

So in 2003, glyphosate was not considered a carcinogen so she said, "My prior knowledge, what I believe because of science and what we know now in 2003, glyphosate shouldn't be a carcinogen. So my estimate of 2.1 may be an overestimate." Right? "I'm actually calling something a carcinogen I shouldn't be calling a carcinogen, so I'm downweighing this." And then she comes up with the hierarchical estimate of 1.6.

Q. Okay. And what's the confidence interval for that regression?

A. .9 to 2.8.

Q. Okay. And I just want to -- and this was adjusted or unadjusted?

A. Adjusted.

Q. Okay. For the same 47 chemicals?

A. That's what the hierarchical regression does, yeah.

Q. Oh, okay.

And so you told -- you just told the jury that there were assumptions made in the hierarchical regression.

A. Right.

Q. And those assumptions were based on previous determinations, and I think you mentioned EPA and IARC.

A. Right. And IARC hadn't made one.

Q. Okay. And has -- if IARC has ruled on a chemical within that model, what effect does that have on this analysis?

A. So the weight she gave the 2.1 was .3, meaning there's only 30 percent chance that this is really true. If she would use the IARC evaluation from 2015, according to what she said in this assessment --

MS. MATTHEWS JOHNSON: Objection, Your Honor.

THE COURT: Overruled.

THE WITNESS: -- in this weighing --

THE COURT: Overruled.

You can answer.

THE WITNESS: Sorry.

-- it would have been either a .9 or a .8. So meaning that 2.1 would have been pretty much 2.1 because what she's doing is she's saying, "I want to correct. I want to correct my data-driven estimate with what I believe and know from everything else in the world we know so far. So if it hasn't been classified as a carcinogen, then I'm not as certain that really the 2.1 is true and I should downweigh that and not alarm people."

That's why we do this. We are very careful as scientists. We want -- we don't want to cry wolf. Nobody will believe us anymore; right?

So what she did here is she downweighed her own data with a weight that draws it closer to the 1 saying "Ah, we may have overestimated." And that weight was .3 and it was based on the knowledge of 2003.

BY MS. WAGSTAFF:

Q. Okay. So in 2003, IARC, you're telling the jury, has not ruled on the glyphosate chemical at that point?

A. No.

Q. Today has IARC ruled on the glyphosate chemical?

MS. MATTHEWS JOHNSON: Objection. Cumulative.

THE COURT: Overruled.

THE WITNESS: Yes.

BY MS. WAGSTAFF:

Q. And what was IARC's ruling on glyphosate?

A. It's a 2A probable carcinogen.

Q. Okay. And in your opinion, based on your knowledge and experience of environmental epidemiology, redoing -- should this number be redone based on the fact that IARC has now ruled on glyphosate?

A. Absolutely, because the weight should change and that estimate would change.

Q. Okay. And does this -- when you redid it, would it drive the risk ratio up or down?

A. It would go towards the 2.1. Be almost 2.1, maybe 2.

Q. Okay. And so you just mentioned the word "carcinogen." Can you tell the ladies and gentlemen of the jury what a carcinogen is?

A. Well, the definition for "carcinogen" is an agent that can cause cancer, and actually the IARC classification was based on

NHL for glyphosate.

MS. WAGSTAFF: Okay. And as far as timing, Your Honor, I know that you're mindful of the jury's time, it might be good if I could just get through three more studies and finish and then finish up in the morning. I don't know what your schedule --

THE COURT: Well, keep going. We'll see how things are going.

MS. WAGSTAFF: Okay. Excellent.

Q. All right. Let's talk about the next study, which is Eriksson, which is on page 4 -- or Binder 452.

If you could pull that up, Mr. Wolf, and turn to Table 2, please.

All right. Dr. Ritz, if you could tell the ladies and gentlemen of the jury, please, about the Eriksson study.

A. So this is another Swedish study, but it's done much later than the first study, and it's done in other parts of Sweden. They are now also including more of Southern Sweden.

And otherwise they're doing exactly the same kind of study. It's a case control study, but they're now more conscientious about having to actually assemble a lot of cases so it's almost a thousand cases, 910, and as many controls and they're going out there again in the same way asking people about their work exposures.

Q. Okay. And if you look at Table 2, please, and if you

highlight glyphosate, can you explain to the jury, please, what those three rows tell you and give me data to write on the board?

A. Right. So they learned their lesson they need a lot of cases in order to look at exposures, and you can see that instead of 4 and 8, they now have 29 exposed cases. And in those -- with those 29 exposed cases and 18 exposed controls, they estimate a relative risk of 2.02 and the confidence interval is 1.10 to 3.71.

So this is a new study, new cases that arrived later in time. More of them were exposed, which makes a lot of sense because glyphosate use increased. Right? So we now have actually a lot more data to base our opinion on, and we see again a twofold risk increase and we would call this statistically significant because it excludes the 1; right? It's on that side of the 1, 1.1.

Q. Okay. And was this data adjusted or unadjusted?

A. It's unadjusted for other pesticides but adjusted for age, sex, and year of diagnosis and enrollment.

Q. So we're going to call it unadjusted because we're just worried about pesticides.

A. Right.

Q. And so is there any other data that you found relevant with respect to this study?

A. Yes. So they must have read the McDuffie study and said,

"Well, what they can do, we can do. So let's actually now distinguish between occasional users and regular users" -- right? -- "people who use it a lot."

And in their data that was a 10-day difference. Before we had a one- to two-day, more than two days. Here they said -- and, I mean, it makes sense -- right? -- because we're now using more glyphosate, and so more people used for more days. And here it's below and above 10 days, and that splits their exposed group nicely into two, which is, again, a nice statistical property, that's what we want, and we're getting now risk ratios of 1.69.

Q. Is this for the zero to 10 days?

A. Yes.

Q. Okay. 1.69?

A. Right.

Q. Okay.

A. And the next one is -- oh, the confidence interval is .7 to 4.07. So I don't have --

Q. .7 to what?

A. .7 to 4.07.

Q. Okay.

A. And I don't have yet the statistical power to say this is significant, but it's definitely above 1, the point estimate, 1.69. And then we have the one that's more than 10 days and we have a 2.36 with a confidence interval of 1.04 to 5.37.

Q. Okay. And, Dr. Ritz, these are all unadjusted numbers; correct?

A. Yes.

Q. And so is this a dose analysis just like the McDuffie study?

A. That's what they are attempting to do here. They are trying to say there are unexposed people, there are people who are occasional users and exposed, and they're the ones who are using a lot.

And as you can see, the risk is different if you're using a little bit, maybe 69 percent risk increase but we can't say. The confidence interval is wide; right? But definitely the ones using more than 10 days, they are more than twofold risk increased.

Q. Okay. And so if you could actually, Mr. Wolf, turn to Table 7.

And here it looks like the Eriksson scientists also did a multivariate and a univariate analysis, and I want you to explain to the jury why that's not actually a new concept.

A. Right. So this is -- I think we had that before, that we had a univariate and a multivariate. Univariate again says, "You know, I'm testing one factor, one pesticide at a time." Multi, "We have multiple pesticides we are testing." So we are co-adjusting for other use. We are making these comparison groups more similar in terms of all the other pesticides. We

only are interested in them being glyphosate differently exposed.

And in that -- and that multivariate adjusted estimate is 1.51 with a confidence interval of .77 to 2.94.

Q. All right. And is it fair to say that is an adjusted analysis?

A. Yes.

Q. Okay.

A. But, remember, that's an analysis of ever/never. We are not looking at people who have more than 10 days versus less than 10 days. This is everybody's called a user.

Q. Okay. And, actually, Mr. Wolf, if you could pull back to page 1659 and to the top of -- right above Table 2.

And, Dr. Ritz, if you could turn your binder to page 1659 and tell us what that area of the study means to you.

A. So -- so these authors also do something differently that is a good way of looking at your data from a different perspective to gain even more information about whether it matters when you were exposed and not just whether you were exposed and how much you were exposed.

And these analyses we call latency analysis. So what -- basically what they're doing here is saying, "Okay. It's not only important whether you were one day or 10 days exposed or more, but when those 10 days were. Are those 10 days per year or whatever they were" -- right? -- "or they were within the

last 10 years before you got diagnosed with NHL or was that actually before?"

And that's what they're estimating here. They're saying, "Let's just look at the time 10 years or more prior to diagnosis or within that 10-year period until you were diagnosed and see what we see there."

Q. Okay. And what did the scientists see when they did that analysis?

A. They saw that with a latency of more than 10 years -- so the exposure didn't happen in the last 10 years right before you were diagnosed but 10 years earlier -- that odds ratio was 2.26.

Q. 2.26. Okay. I'm going to have to write it a little differently because I'm running out of room.

A. Right. And the confidence interval is 1.16 to 4.40.

Q. 4.40?

A. Yes. So, again, it means if you were exposed 10 days or more in the past, then your risk is more than twofold, and in this case statistically significant.

Q. I think you meant to say 10 years.

A. More than 10 years in the past.

Q. Okay. I just wanted to make sure there was --

A. Yes. Not in the last 10 years prior to diagnosis but even earlier.

Q. Okay. Let's look at the next case, Doctor, which is Orsi.

A. Uh-huh.

Q. I don't have the binder number written down for some reason.

A. I got it.

Q. It's Binder Number --

A. 898.

Q. -- 898.

And if you could tell the jury, please, a little bit about this study.

A. So now we're going to France and we know that French people like wine, and they have a lot of cheese and agriculture and they have the same problems we have here. They're using pesticides and insecticides to save their crops -- right? -- and herbicides to get rid of weeds and they have cancer.

They don't have, I think, a National Cancer registry, at least they're not using it here. What they're doing is they go to hospitals and they now go to hospitals within big cities, the biggest cities in France, including Bordeaux, which is a wine region, and Lyon, which is another wine region, and some others, and they are -- everybody who comes in with NHL, they try to enroll in their study, take blood, and ask them what their occupation was and what kind of pesticides they used.

But we need the control group; right? So we need people who didn't have NHL and then we want to compare: Well, is what the people with NHL did different from those who didn't --

right? -- didn't get it?

And so they go to other parts of the hospital and enroll other patients and say, "Well, you don't have NHL, you have something else and different diseases. Tell me what you are. And, you know, were you a farmer? Have you used a pesticide?"

And that's what we call a hospital-based case control study. It's not what we've seen before where we went into the -- from the population register we selected people. And the American study also they actually went into the population and asked people to participate. This is simply patients. Anybody who comes to the hospital and doesn't have NHL is now allowed to enroll as a control subject. They have other diseases.

So the question we have when we do these kind of studies is: Is that a good comparison group? Because if the pesticide may have also caused these other diseases, what do I do? I generate a bias. We call that a selection bias because if the pesticide brings you to the hospital, then you cannot determine whether NHL was, you know, more -- people with NHL were more exposed than those who didn't get it because the others just got something else. Right? I'm not saying that that happened, but we're worried about this when we do these kind of studies, and that's why we call them hospital-based.

And that's actually the type of study that has given the study design a slightly bad name because we never know whether

the other patients really are a good comparison group. And it's also a smaller study so we have 244 cases and 560 -- 56 controls, but you know now they are not really healthy people from the population. They're people who came to the hospital for other diseases.

Q. Okay. And can you tell me the data that this hospital study found?

A. So they looked at lots and lots of pesticides, and they also looked at subgroups of non-Hodgkin's lymphoma; but for all cases, the 244 non-Hodgkin's lymphoma, they had 12 exposed cases and for them they estimated a relative risk of 1 with a confidence interval of 0.5 to 2.2 and it was not adjusted for other pesticides.

Q. Okay. Great.

And what table did you get that data out of?

A. Three.

Q. Okay. So if we could turn to Table 4, please.

Can you explain how the data in Table 4 is different than the data in Table 3?

A. Yes. So these are people who are starting with the hospital, and at the hospital they have pathologists and these pathologists can tell you we have -- you know, maybe or not -- that non-Hodgkin's lymphoma has different subtypes, and so they said, "Well, let's at least look at some major subtypes and see whether these subtypes actually have increases or not."

And so here they're giving you an estimate for diffuse large-cell lymphoma follicular and then for chronic lymphocytic leukemia and hairy-cell leukemia.

Q. Okay. So let's turn to the next one.

THE COURT: Before we do that, how much time do you have on the next one? I'm thinking this might be a good time to wrap up for the day.

MS. WAGSTAFF: I think that if I could get through the North American Pooled Project, maybe five or so minutes, that leaves the AHS for tomorrow. That's a good break.

THE COURT: Okay.

BY MS. WAGSTAFF:

Q. All right. If we could turn to, in your binder, 899 and 900.

A. Yes.

Q. Before we publish anything, why don't you tell the jury what the North American Pooled Project is.

A. Yeah. So this is not a new study at all. This is actually an effort that unfortunately has never been published yet, but yet another effort to bring more data together so we can do more fancy things with the data; right?

And so what data do we have? We have now all of the North American data from these case control studies in Kansas, Nebraska, Minnesota, and Iowa and we are adding the six provinces of Canada to it. So we now have a huge dataset of

all those cases in the rural North American states plus the Canadian states. Not new data, just looking at the same data with different tools.

Q. Okay. And let me just jump back up to De Roos real quick. Was Dr. Weisenburger an author of De Roos 2003?

A. Let me see, which tab is it?

Q. 451.

A. I should know that.

(Witness examines document.) Yes, he was.

Q. Okay. And is Dr. Weisenburger also an author of the North American Pooled Project, if you know?

A. (Witness examines document.) There's no name on there. Oh, wait. He's not -- yeah. He's on the second slide set from Brazil.

Q. Okay. So why don't we go to -- explain what these two documents are, 899 and 900, please.

A. So these are now not published results. They are slide decks, and we prepare them to go to conferences, show results, and discuss them with colleagues, and that's what these are.

Q. Okay. And these aren't numbered unfortunately, so, Mr. Wolf, if you could turn to the 12th page of Exhibit 899. Yep, that's it.

Dr. Ritz, could you tell the ladies and gentlemen of the jury, please, what this data is and the significance of this data, please?

A. Right. So, again, we are pooling. Now we are pooling across the McDuffie Canadian study and the De Roos American studies, and you can see that we are really increasing the number of cases that reported glyphosate use to 113. That's a really nice number, big number.

Q. Okay. And so what data was found?

A. So in this analysis, they are presenting a relative risk of 1.22 with a confidence interval of .91 to 1.63.

Q. Okay. And is this adjusted or unadjusted?

A. This is actually adjusted and it's adjusted for 2,4-D use, Dicamba use, and malathion use. So three different pesticides have been entered into the model.

Q. And if you could please turn to page 14, Mr. Wolf.

A. Yeah.

Q. And this is some additional data that the North American Pooled Project found about glyphosate handling NHL risks; right?

A. Right.

Q. And is this a dosing analysis?

A. This is the same analysis we already have discussed with McDuffie where they said "Let's distinguish between the people who use very little, one day or two, and the people who use more than two days." It's the same analysis but it's more data. It's not just Canadian data. It's the American data as well.

Q. Okay. So that would mean that this is also a dosing analysis?

A. Yes.

Q. Okay. And can you tell us the data that this dosing analysis from the North American Pooled Project gives us?

A. So the zero to -- more than zero and less equals two is .83, and the confidence interval is 0.51 and 1.34.

Q. All right. Let me write that down. So for zero to two days --

A. Yeah.

Q. -- it's .83?

A. Uh-huh.

Q. With a confidence interval of -- can you read that again?

A. 0.51 --

Q. Okay.

A. -- to 1.34. So essentially there's no effect. When you're only -- when you're an occasional user, one or two days, no effect. We've seen that before; right? But this --

THE COURT: Sorry to interrupt, Dr. Ritz.

Ms. Wagstaff, you didn't ask for this to be published in front of the jury. Did you want this?

MS. WAGSTAFF: Oh, yes. Please, can this be published in front of the jury?

Thank you, Your Honor.

Q. Okay. And so this is -- is this adjusted as well?

A. Yes.

Q. Okay.

A. So the only difference is we have more data, we're doing the same analysis, and now we are also putting these other three pesticides into the model saying we are co-adjusting. We are -- we are taking care of potential bias because people were also exposed to these other pesticides.

Q. Okay. And so when you did over two days --

A. Right.

Q. -- what were the numbers?

A. 1.98, so almost 2.

Q. 1.98. Okay.

A. Uh-huh. And a confidence interval of 1.16 to 3.4.

Q. 3.4?

A. Uh-huh.

Q. Okay. And was that adjusted or unadjusted?

A. That was adjusted.

Q. Okay. And so this is a statistically significant adjusted dose analysis --

A. Correct.

Q. -- is that correct?

Okay. Now, if you move two over, it looks like the same analysis was done for DLBCL?

A. Yes, and this is actually one reason why they probably are trying to do this pooling of data, throwing them all together,

because now they have enough cases to also look at subtypes of non-Hodgkin's lymphoma. So they don't have to call all lymphomas the same. They can actually look at different types. And there's this type called DLBCL in the third column there.

Q. Can you tell the jury what, if you know, what "DLBCL" means?

A. Diffuse lymphocytic B-cell lymphoma.

Q. Okay. So DLBCL?

A. CL.

Q. Okay. And they did two analyses for DLBCL; correct?

A. In the same way that we had for overall.

Q. Okay. So I'll just put this data on the other side and use this.

For the zero to two days, what was the data for DLBCL?

A. Again, we see a .77 with a confidence interval of .37 to 1.58, meaning there's nothing or, if anything, it's protective, which we don't believe. But, you know, there's no effect if you're an occasional user.

Q. Okay. And what about for the people who were in the high-dose group?

A. That odds ratio is 2.49 with a confidence interval of 1.23 to 5.04.

Q. 5.04, okay.

And are these adjusted numbers as well for DLBCL?

A. Yes.

Q. Okay.

A. For three different pesticides.

Q. Okay. So I just want to square off these as being adjusted dose and statistically significant; right?

A. Correct.

Q. Okay.

A. They actually give you a P for trend. That's a trend test for dose.

MS. WAGSTAFF: Okay. Excellent.

Your Honor, this would be a good time to stop for the day.

THE COURT: Sure. That would be great.

Okay. Ladies and gentlemen of the jury, we're done with day one. Thank you for being so attentive.

And I'll remind you once again, because of how important it is, don't go home and talk to anybody about this trial or how it's going or what you're learning. Don't do any independent research on your own. Don't look up any terms on the Internet or anything like that.

And stay away from any media reports on the case. And if you accidentally come across a media report, please turn away immediately and don't pay attention to it.

If you've been exposed to any information that you should not have been exposed to or if you have reason to believe that somebody else on the jury has been exposed to information they should not have been exposed to, please let us know as soon as

you can.

And with that, we will see you tomorrow.

And, Mr. Pungyan, I'll be with you in a few minutes back there to discuss your issue.

(Proceedings were heard out of the presence of the jury:)

THE COURT: Okay. Thank you, Dr. Ritz. You're free to step down.

THE WITNESS: Thank you.

THE CLERK: Please be seated.

THE COURT: So is there anything you-all want to talk about before I go back and chat with Mr. Pungyan briefly and then bring him out?

MS. WAGSTAFF: Your Honor, may I take a picture of this just since we're going to leave it in the courtroom?

THE COURT: Good idea.

MR. KILARU: Can we do the same, Your Honor?

THE COURT: Sure.

MS. MOORE: Not before you talk to the jury.

THE COURT: Okay.

MS. WAGSTAFF: I do have one housekeeping item.

THE COURT: Okay.

MS. WAGSTAFF: This is Exhibit Number 914. We updated these graphs recently to include that new study that came out, and there was a mistake in the one that I gave you.

MR. STEKLOFF: We have it.

MS. MATTHEWS JOHNSON: We have ours.

THE COURT: Okay.

MS. WAGSTAFF: So if you want to just rip out the 914 you have and put that in there, that will be great.

MS. MOORE: Your Honor, we can hole punch it too.

MS. WAGSTAFF: I'm sorry.

THE COURT: No worries.

MS. MOORE: Thank you.

MS. WAGSTAFF: It just had a dot where there should be a square and a square where there should be a dot.

THE COURT: Very important distinction.

Okay.

THE CLERK: I'll give that back to you.

MS. WAGSTAFF: Thank you.

THE COURT: Okay. Do you want to talk about ground rules for conversations with experts during their testimony?

MR. STEKLOFF: I think our view, Your Honor, is that once a witness is passed for cross-examination, then the witness should not be -- I would have no problem, for example, them trying to refine and make their examination of Dr. Ritz more efficient now; but once a witness is passed, I think that it runs into issues.

THE COURT: Sounds good.

MS. WAGSTAFF: We're okay with that.

THE COURT: Okay. That will be the rule then.

MR. STEKLOFF: And I think the only issue we have to raise is really just what -- it is unclear to us which witnesses plaintiffs planned on presenting. I suspected deposition testimony, but it is unclear to us how they're filling the next day.

THE COURT: Aren't we supposed to know that by now?

MS. MOORE: Yes, Your Honor, and we did e-mail them about that. We notified them that tomorrow we will be finishing up with Dr. Ritz, and then our plan is to go right into video deposition and that would be Dr. Portier.

There was a little bit of discussion --

THE COURT: Well, wait a minute. There's a little bit of a problem there.

MS. MOORE: I know and that's what I was going to get to. We have teed up Dr. Portier and also Dr. Reeves, and we've had meet and confers about that. So depending on the Court's orders, we have the tech people working on getting both of those depositions ready and that way they can take out whatever the Court says excluded, and we'll be ready to roll. So it will be video depositions following Dr. Ritz.

THE COURT: Well, except that I have not yet received evidentiary objections to any aspects of Portier's testimony that you want to designate, or Reeves for that matter, so I think you need to be ready with something else --

MS. MOORE: Yes, Your Honor. I understand.

THE COURT: -- in case you haven't gotten that to me in time for me to rule on the objections.

MS. MOORE: I understand, Your Honor. And so to kind of back up and let you know what's happened with that, so of course you know Dr. Portier was taken last week. We have expedited everything as much as we can with the teams coming from Australia.

We sent --

THE COURT: I understand it's hard and I'm sure you've run into problems along the way. All I'm saying is that you cannot count on beginning Dr. Portier's testimony tomorrow and you cannot count on beginning Dr. Reeves' testimony tomorrow because you have not yet given to me the objections to the designated testimony for those two individuals and, therefore, I cannot rule on the objections.

So you have to be ready with something else, whether it's the three treating physicians or Dr. Weisenburger or whoever. You need to be ready with another witness in case that hasn't been teed up on time.

MS. MOORE: I understand, Your Honor, absolutely. No question about that.

THE COURT: And just to be very clear, it's coming out of your time if you're not ready with something else.

MS. MOORE: I understand that, Your Honor. I will not let that happen.

Going back to Dr. Portier, we notified the defense that our plan is to present his direct testimony for Phase I on Tuesday, and we asked them if they would be withdrawing any of their objections that were made contemporaneously. They've gotten back to us. I believe I have an e-mail from today on that.

So we are now -- we'll be prepared, if the Court would entertain us, to hear some arguments about that. I think some of it is kind of some broad issues. If we could get guidance from the Court, we'll be able to meet and confer and narrow that down so we can try to start Dr. Portier tomorrow after Dr. Ritz is off the stand.

So we have done that. It's not been filed with the Court, but there's been meet and confer on that.

With respect to Dr. Reeves, I understand it has been filed now with the Court and we do have copies of the transcript that we'll be able to hand to Your Honor. And, again, it's also some big global pictures that we can kind of talk about that will help us know whether or not either side will continue to maintain certain objections.

THE COURT: So you have the hard copies of Reeves and -- is it Reeves you have?

MS. MOORE: Dr. Reeves is what we have, yes, Your Honor.

THE COURT: And this is the hard copy of the

deposition transcript with the objections interposed?

MS. MOORE: That's correct, Your Honor. So we have copies of that and we've been -- that's after several meet and confers about Dr. Reeves.

THE COURT: So what do you want me to do? Do you want to have argument about that now or --

MS. WAGSTAFF: I've got five copies so --

THE COURT: I think we probably need one or two. Maybe two.

MS. WAGSTAFF: It's a two-day deposition. So, Your Honor, here's --

MS. MOORE: Your Honor, so we're -- we had discussed with defense, and I don't know if you wanted to address the juror issue first because I don't want to have him wait, but we were prepared to, if the Court would entertain us, discuss Dr. Reeves, Dr. Blair, and Ross and Dr. Goldstein, as well as Dr. Portier. And some of this can go fairly quickly because once we get an idea from the Court, it's -- there's an objection as to whether we can even play Dr. Blair, Ross, and Dr. Goldstein in Phase I at all.

THE COURT: I assumed there might be.

MS. MOORE: So I think, you know, if we get insight from Your Honor on that, then that's going to take away a lot of the issues that we may have with those depositions. So I don't think that's going to take that long.

THE COURT: Okay. I'm happy to have a discussion with you in the abstract if that will help, but I don't know if I'm going to be able to rule on the abstract. I might need to actually read the testimony and the objections --

MS. MOORE: I understand, Your Honor.

THE COURT: -- and spend a little more time thinking about it.

MS. MOORE: For example, on Dr. Goldstein, this is his --

THE COURT: Well, like I said, I'm happy to have an abstract discussion with you after we deal with the juror issue.

MS. MOORE: Okay.

THE COURT: But why don't you give me five minutes, I'll go back and chat with him briefly, and then likely we'll bring him out.

MS. MOORE: Okay.

THE COURT: By the way, let me ask you this: Assuming -- I passed on certain basic information to you about his situation this morning. Is either side going to want to ask him further questions about that?

MS. MOORE: I don't believe so, Your Honor. I mean, it sounds like he has an economic hardship similar to what we've -- what you excused other jurors on.

THE COURT: And so what's -- do both sides agree that

I should excuse him based on what I've described to you?

MS. MOORE: That's our position, Your Honor.

MR. STEKLOFF: I think, Your Honor, it's just worth following up, and I do not need to ask any questions. I would be happy for you to follow-up with him; and if the economic hardship still presents, I would defer to your judgment on that. I don't need to talk to him about that.

THE COURT: Okay.

MR. STEKLOFF: But I think it is worth following up with him to explain the conversation that you had and just make sure there are no issues.

THE COURT: Okay. Sounds good.

MS. MOORE: All right. Thank you, Your Honor.

THE CLERK: Court is in recess.

(Recess taken at 2:54 p.m.)

(Proceedings resumed at 2:57 p.m.)

(Proceedings were heard out of the presence of the jury:)

THE COURT: Okay. We are back on the record.

Mr. Pungyan, I'm going to repeat for the record what I've already discussed with you back there. So the first thing is that you expressed concern to us that on the day of jury selection, your wife was informed that her hours were being cut. And you initially thought it would be okay to serve on the jury but after you learned that your wife's hours had been cut, that was a real problem for you and your family because

her hours are cut and your hours would be cut because typically you work Friday -- sorry -- Wednesday, Thursday, Friday, Saturday, Sunday at Kaiser.

So when I heard of this concern, I got on the phone with the Kaiser general counsel's office, and I said, "Is there anything you can do for this guy given the situation? Can you pay him for, you know, five -- during the time he's on the jury can, you pay him five days a week as he's been working even though he wouldn't be working Wednesday, Thursday, Friday?"

And the response I got was that if there was anything in our power to do it, we would; but his employment is governed by a collective bargaining agreement, so it would actually be illegal for us to compensate him for the jury service.

So that while we can -- while we can guarantee that he would work a shift on Thursday -- in addition to his regular Saturday and Sunday shift -- we can't unfortunately do anything more than that. And so I relayed that to you this morning, and you expressed the concern to me that that would -- just working on Thursdays in addition to Saturday and Sunday would be inadequate based on the fact that your wife's hours were cut at her job. Have I accurately described our conversation and your feeling about it?

JUROR PUNGYAN: Yes, Your Honor.

THE COURT: So is it your feeling that given the situation that I have just described, which was not your fault

as unanticipated, of course, that it would be an economic hardship for you to serve on the jury?

JUROR PUNGYAN: Yes, Your Honor.

THE COURT: Does anybody wish to ask Mr. Pungyan any questions?

MS. MOORE: No, Your Honor.

MR. STEKLOFF: No.

THE COURT: I will go ahead and have you go back to the jury room. Sit tight and wait for a report. We will be with you in a few minutes. Thank you very much.

(Juror Pungyan exited.)

THE COURT: Is there anything else anyone wants to say about Mr. Pungyan?

MS. MOORE: No, Your Honor.

THE COURT: I was not anticipating losing one of our nine jurors on the first day of trial. It is no fault of his own, and I'm very appreciative for him being willing to serve during selection on Wednesday even though it would have already been financially difficult for him, and I think it's an unexpected development for him means I think we will have to excuse him. So I will be excusing him. Let me go back there real quick and let him know, and I will call you back in just a minute.

(Recess taken at 3:00 p.m.)

(Proceedings resumed at 3:02 p.m.)

(Proceedings were heard out of presence of the jury:)

THE COURT: So for the record, I just went back and I told Mr. Pungyan that all the restrictions still apply to him in terms of talking about the case until after the case is over. So he's under a court order now that he's not to speak with any members of the media or anybody else about the case or what's happened thus far.

Okay. So what do you-all want to talk about?

MS. MOORE: Your Honor, on an abstract issue, probably the -- as soon as I say the easiest, it probably will not be the easiest, but the easiest one, we want -- the plaintiff wants to play a very short -- thank you -- a very short deposition of Dr. Goldstein who was designated as Monsanto's corporate representative. And this deposition what we designated I think is around 12 or 13 minutes, Your Honor. And it concerns the 1997 Dr. Acquavella memo.

And as the Court will recall, that was one of the issues that we brought to the Court's attention after the phased trial decision came down, and it's Plaintiffs' *Motion in Limine* Number 14, Your Honor, and Pretrial Order 81.

And it's our understanding that the Court is permitting us to introduce during Phase I Dr. Acquavella's July 22nd, 1997, memo criticizing the AHS for the purpose of impeaching any Monsanto expert to rely on it.

Your Honor, it's our position that instead of having to

wait until their case-in-chief to impeach an expert, we would like to go ahead and play that deposition since it's a corporate rep; and clearly from the opening this morning, we know that the AHS is central to their defense in this case, and that's why we would like to go ahead and play it in Phase I.

MR. KILARU: Your Honor, we think it would make -- how we understood the ruling was that they could confront the experts who talk about the AHS with the Acquavella memo and ask questions about it as opposed to having in their case-in-chief affirmative testimony played from a witness about what that study says.

THE COURT: Well, what's the difference at this point? I mean, I think, you know, your argument on that point was well taken, you know, in the abstract; but thinking about it practically now and after, you know, listening to the opening statement and knowing just how much Monsanto is going to be relying on AHS, what's the difference?

MR. KILARU: Well, I guess just in terms of it being an impeachment issue, you know, there's not really an actual evidentiary statement from anyone about the AHS. As we were told repeatedly I think is correct, the arguments in the openings are not evidence.

THE COURT: I guess I'm asking you, as a practical matter, what's the difference?

MR. KILARU: It's more a question of whether we get to

present our position on it first versus the plaintiffs coming in with it, which is how I think an impeachment would typically work. Ultimately I recognize that sort of the point will come in at some point, but I do think to the extent it's an impeachment, the ordering does matter somewhat.

THE COURT: Well, I think, you know, given the need to -- I mean, it's either going to come -- that testimony is either going to come in now or it's going to come in a little bit later; and I think, you know, in terms of ordering the trial and given the contents of the opening statement -- it's true that an opening statement is not evidence, but something a lawyer says in opening statement can open the door to evidence coming in that might not have come in before.

I think -- I just think it, A, it doesn't matter, it really doesn't matter when this evidence comes in; and, B, given the opening statement, I think it would be fine for the plaintiffs to bring that in now.

So that's fine. You can play that.

MS. MOORE: Thank you, Your Honor.

And we'll have that ready. And, again, I understand the notice rules and so if there's an objection, we can deal with that.

THE COURT: Say again.

MS. MOORE: I understand the notice rules as far as when we have to tell them about depositions. In light of, you

know, the Portier rulings that we need to get from Your Honor, the Goldstein one, which is very short, we can work that out. It's already cut so I would like to go ahead and tell them that that would be our backup deposition tomorrow to be played to try to keep things moving along.

THE COURT: Okay.

MS. MOORE: Okay. Thank you, Your Honor.

And then the other issue, the other depositions, if I could, Your Honor, do those in conjunction, and that is Dr. Aaron Blair and Dr. Matthew Ross, and --

THE COURT: Was Ross another member of the IARC?

MS. MOORE: Yes, Your Honor, he was.

THE COURT: Okay.

MS. MOORE: And the Ross deposition is very short. I don't have the exact time. It's less than -- now with the designation, it's less than an hour, Your Honor.

But both of these, it's our position, and this relates to --

THE COURT: I mean, let me just say one thing just to make it clear. You keep referencing the breadth or the brevity, I should say, of the excerpts. You know, you have overall time limits and how you use your time is up to you. So given that you have overall time limits, I'm less concerned with the length or brevity of the excerpts and far more concerned with whether they fit within Phase I or not.

MS. MOORE: And that's fair, Your Honor. I probably just have this chess clock running in my head so that's why I keep saying it. So I apologize.

This relates to, Your Honor, your order, Pretrial Order Number 81. It's Monsanto's *Motion in Limine* Number 1. And as you'll recall, it's our understanding from the ruling in the second paragraph that, Your Honor, you ruled that witnesses, which would be Dr. Blair and Dr. Ross, who participated in IARC may testify that they were a member of the IARC committee, may further explain how that membership supports their credibility, but must limit their scientific testimony to their own independent conclusions.

THE COURT: What are you reading from?

MS. MOORE: Your order, Your Honor.

MR. KILARU: MIL Pretrial 81.

MS. MOORE: It's 81, Pretrial Order 81.

THE COURT: Let me go back there.

(Pause in proceedings.)

THE COURT: Okay. But when I said that, I was referring to expert witnesses who you were calling.

MS. MOORE: Yes, Your Honor.

THE COURT: Okay.

MS. MOORE: And we designated Dr. Blair and Dr. Ross both as nonretained expert witnesses when we did our expert disclosures in November of last year in accordance with the

Court's pretrial order.

THE COURT: Okay.

MS. MOORE: And so the reason we've teed this up this afternoon is that we had meet and confers with Monsanto. I think it's their position we shouldn't be allowed to play any part of Dr. Blair and Dr. Ross, even any of it in Phase I. Our position is that we should and we went ahead and did a meet and confer. They didn't waive their objection, Your Honor, to playing it in the entirety, but we went ahead and did a meet and confer. So those depositions have been narrowed down substantially based on that meet and confer.

THE COURT: I don't think I'm in a position right now to rule on whether Blair and Ross can testify at Phase I. I would think that I would want to look at the content of the testimony.

MS. MOORE: That's fine, Your Honor. And I can hand -- I think -- Your Honor, I think you already have the color transcripts with the designations, counters, and objections for Dr. Blair. I also have a copy, Your Honor, of Dr. Ross that I can hand to you.

MR. KILARU: Your Honor, I'm not actually sure that's accurate. I don't think -- I'm not accusing anyone of anything. I think the only ones that have been filed thus far with Your Honor are Reeves and Ross. I do not believe that Blair has been filed or submitted.

MS. MOORE: Your Honor, if it has not been filed yet, it's been agreed upon by the parties, and so it may just not have gotten filed, but we did hand you a copy of the transcript that the parties have reached an agreement that that is the designations and the objections that we'll need rulings on.

THE COURT: I think all I have in front of me right now is Reeves.

MS. MOORE: Oh. I apologize, Your Honor.

THE COURT: So I don't know what you filed.

MS. MOORE: Oh, sorry. Sorry. I misspoke, Your Honor. I'm sorry. That's Dr. Reeves.

THE COURT: So this is Dr. Reeves' testimony that is, like, ready for me to review for objections?

MS. MOORE: Yes, Your Honor. Yes, Your Honor. And that's filed. And then I'm handing you now Dr. Ross.

I apologize, Your Honor.

THE COURT: Okay.

MS. MOORE: And I have a copy for counsel too. And this is the color transcript. My understanding is Dr. Ross is filed and that this is the color transcript that would contain the designations and the objections. And as you can tell, Your Honor, it's not that many pages on Dr. Ross.

THE COURT: Okay. All right.

MS. MOORE: And I will come back, Your Honor, on the issue. My understanding is Dr. Blair we have reached an

agreement as to what transcript we should present to you for decision, and I will find out if that's filed. I thought it was so I apologize if I misspoke.

THE COURT: Okay. But if it's going to be filed, do you have a hard copy there of what is going to be filed?

MS. MOORE: I'm being told I do not right now --

THE COURT: Okay.

MS. MOORE: -- but I will try to get that, Your Honor.

THE COURT: Okay. And Monsanto's position, I gather, is that I should draw a distinction between Blair and Ross on the one hand and Portier and Jameson on the other hand in terms of whether any testimony should be allowed from them on the IARC and their participation in the conference?

MR. KILARU: Yes, Your Honor. Could I briefly explain that a little bit?

THE COURT: Yes.

MR. KILARU: Just as a technical disclosure matter, both Blair and Ross we acknowledge were disclosed back in November as nontestifying experts, but on the witness list that was filed a couple nights ago they were listed as Monograph 112 participants and I think that accurately reflects what their testimony is.

They do not have independent scientific conclusions. What the deposition testimony is is them essentially repeating the conclusions of IARC, and that I think would be not what was

envisioned by the *motion in limine* ruling. I think that would go beyond the rule that we intended for IARC to have.

THE COURT: Okay. I understand. I understand the landscape I think, and I'll just look at the testimony.

MS. MOORE: Thank you, Your Honor.

The only other issue --

MR. KILARU: Sorry. Just one housekeeping thing to go back on Goldstein.

I'm sure we can get a transcript on file if you want to review it. There were a few other more minor objections that I don't know if -- because you haven't seen, you haven't had a chance to rule on. I don't think they will take long, but I just want to flag that I don't think we're sort of camera ready on Goldstein just yet even though I acknowledge your ruling on the broader issue.

MS. MOORE: Your Honor, we will have the color transcript delivered for Dr. Goldstein and Dr. Blair this afternoon so you will have that in hand.

And then the only other point I wanted to bring to Your Honor's attention is that with respect to Dr. Blair, he also was a co-author of the De Roos 2003 and he also was an author in the AHS as well. So that was part of the other reason that he was testifying.

THE COURT: It seems to me that a lot of -- it's going to depend largely on what the testimony is.

MS. MOORE: Your Honor, and we tried to narrow that, and we -- you'll see in Dr. Blair more so than Dr. Ross, but in Dr. Blair the first part of his testimony is his background, his credentials. As you'll recall, he was the head of the work group for IARC so he has pretty lengthy credentials. We tried to narrow that down.

And then we went into that he participated in IARC; the conclusion that we very briefly talk about that he reviewed -- you know, he was part of the epidemiology subgroup, and that he very briefly he reviewed the studies. He doesn't go into detail like Dr. Ritz has done today because that would be cumulative so we have just highlighted that.

You know, I'd be fine, you know, if we wanted to cut that out. We suggested that. The defense has objected to us having him answer questions that he reviewed McDuffie, Eriksson, and De Roos in his discussions about reaching his conclusion to vote for the IARC monograph, but then they did not object when it came to the discussion about the AHS.

And so our position is if we're going to talk about epidemiology studies and allow Dr. Blair to say "Here's the ones that we reviewed in reaching our conclusion and our vote," that it should be all of them and not piecemeal. And so I think that's the main issue there.

But, again, it's -- it doesn't get into the weeds of the studies because that's what Dr. Ritz is here to do.

THE COURT: Okay. I'll look at it.

MS. MOORE: Okay. Thank you, Your Honor.

THE COURT: Anything else you-all want to discuss?

MR. KILARU: There are a couple.

THE COURT: So let me just emphasize, given what has been given to me --

MS. MOORE: I know, Your Honor.

THE COURT: -- and given what you're anticipating giving to me later, it seems unlikely that I'm going to be able to get to Dr. Portier's testimony, which has not even yet been given to me. So you need to assume that you're not calling Dr. Portier tomorrow.

MS. MOORE: I understand, Your Honor. And if it would be helpful to the Court, our position would be, from a priority standpoint, Dr. Goldstein and then Dr. Blair and Ross, which you should have this afternoon Dr. Blair, Your Honor.

You know, the Reeves, again, there's some big global issues there that, you know, we have that cut so it is ready to go. I mean, you know, I guess it depends, Your Honor, I don't know what your schedule is. And I apologize, Your Honor. We've done our best to try to get those to you as quickly as we can. But, you know, if you'd rather tackle a bigger one, then Dr. Reeves would be the way to start.

MR. KILARU: Your Honor, I don't know your calendar right now and I wouldn't presume to keep you. There are a

couple big issues that I think would knock out pretty big parts of Reeves that we can talk about, but only if it's helpful to you.

THE COURT: We can try. Like I said, I'm not sure I'll be able to do it in the abstract but, sure.

MR. KILARU: Okay. So if I could give just one example, and it's an issue that actually came up earlier. It is this whole issue of the Knezevich and Hogan study and what evidence should come in and should not.

As you know, you issued a *motion in limine* ruling that we should continue to confer about what do we think should come in, and we did do that over the weekend and what we had offered to the plaintiffs was -- excuse me -- a stipulation, which is the following: Which is to introduce the studies, which I think we've always thought both the initial review and the later review could come in; and a stipulation that during the -- for this case, that during the process of obtaining EPA approval of glyphosate, Monsanto hired Dr. Kuschner to review the tumor slides from the Knezevich and Hogan study based on concerns about the regulatory consequences of that study.

I think that pretty closely mirrors what we had discussed when we had the argument over the sort of pick three pieces of evidence a while ago.

That's where we are. The plaintiffs disagree with that and don't want to accept that, which we understand.

But just to give you sort of a concrete example of what the alternative is that's been proposed, there's 100 pages of testimony in Reeves or 100-page range in Reeves, which probably I would say 50 to 60 pages has been designated, and it is literally all of the memos, including the Lyle Gingrich memo that you mentioned in your order, other internal documents. And those are some of the documents we didn't get before opening but were shown in the opening today. So quotes from that exact memo, quotes from other people, the EPA's responses, and so on.

And I thought one of the purposes of the discussion was to try to streamline what evidence would come in and come to an advance agreement of that, and we submit that our proposal is a better one for moving forward on that as opposed to really extensive discussions through Reeves and also based on what's been seen already.

THE COURT: Well, my preliminary reaction to your proposal is that it's too restrictive, and so I don't -- you know, I don't really know -- I'm trying to go to the slide.

I mean, let me just say that I think the slide -- given the procedural posture, given the fact that this was -- you know, this was still being worked out as to what could come in and what could not come in, the slide was clearly inappropriate; right? I mean, that -- so that's -- you know, I mean -- and, by the way, this is not the first time this has

happened with the plaintiffs where a dispute was teed up and they didn't wait for the dispute to be resolved before they acted; right? And so all of that will be taken into account in connection with the Order to Show Cause whether Ms. Wagstaff should be sanctioned.

And my tentative inclination right now, by the way, is to sanction Ms. Wagstaff $1,000 for these transgressions. I'm also wondering -- I will think about whether to issue an Order to Show Cause why the entire team should not be sanctioned since presumably the entire team was responsible for those slides and for that opening; but I'll consider that later, and Ms. Wagstaff will have an opportunity to file something tonight by 8:00 o'clock and will have an opportunity to be further heard on the matter before I make my final decision.

MS. MOORE: Your Honor, when would you entertain argument on the show cause?

THE COURT: What?

MS. MOORE: When will you entertain argument on the show cause?

THE COURT: I'm not sure yet.

MS. MOORE: Okay. Thank you.

THE COURT: We'll have to find a time. Maybe tomorrow afternoon. Maybe Wednesday afternoon.

MS. MOORE: Okay.

MR. KILARU: I think it would be, through my memory,

about two thirds of the way through towards the end of the animal section is I believe where it came up.

THE COURT: Okay. But I want to flip to the slide, nonetheless, because, you know, the question is -- you know, as I've said, this concept can come in but it's going to be limited. So the question is how to limit it. I think the way you are proposing my gut reaction is that that's too limited. My guess is that the 50 pages of deposition testimony that they want to designate is not limited enough. I don't know. It's just a guess.

This quote "Short of a new study or finding tumors in control groups, what can we do to get this thing off Group C," where was that from again?

MR. KILARU: It's from the Gingrich memo, Your Honor.

THE COURT: It's from the memo we still had not decided if it was going to be admissible?

MR. KILARU: Yeah.

THE COURT: Okay. And then what about this February 1985 quote?

MR. KILARU: I don't have it in front of me so I -- I think you have the only copy.

THE COURT: From EPA, "A prudent person would reject the Monsanto assumption"?

MR. KILARU: So that, I'm not sure exactly which discussion, but it is one of the -- we did discuss many

internal -- not internal documents but EPA documents at the point, and I think -- I don't know if -- just on that, I think one concern that we have is if -- and we understand Your Honor's ruling on this, EPA like IARC is supposed to be limited during the trial -- if we have a lot of EPA documents coming in from the 1980s that suggest doubt about glyphosate, it does seem to present a little bit of a --

THE COURT: No, I mean, I think -- I mean, one of the big questions that was running through my mind is that as Ms. Wagstaff was presenting this, is has she completely forgotten the forest from the trees because the plaintiffs moved to exclude a variety of EPA documents.

MR. KILARU: Right.

THE COURT: And to then get up in the opening statement and start quoting a bunch of EPA documents where it was clear that they were probably not going to be admissible and we hadn't even decided whether that memo -- it was still up in the air whether that internal Monsanto memo was going to be admissible, I mean, in addition to being, you know, intentionally violative of my ruling on the *motion in limine* on the mouse studies, it's, I mean, incredibly dumb. You know, I can't believe that she would have risked opening the door to all of the EPA studies, all the EPA documents, that they wanted to exclude and that I ruled are excludable.

MR. KILARU: Right.

THE COURT: So, you know, there's an issue of misconduct here but there's also an issue of just, you know, are the plaintiffs so intent on committing misconduct, that they're not realizing that they're opening the door to bad evidence against them. So those are the issues that I'm going to need to think about. But again I'm not sure I can give you an abstract ruling.

MR. KILARU: That's fine, Your Honor. I do think that's helpful because one of our concerns is that one aspect of the EPA story doesn't come in and maybe the later aspects that we've got come out.

THE COURT: I think they may have opened the door in their opening statement. I think they may have opened the door to the later EPA documents. I think that's a real possibility.

MS. MOORE: And, Your Honor, if I can address two things quickly; that with respect to the EPA, what we moved to exclude were two documents in particular. And the discussion that you're referencing --

THE COURT: Oh, I know. I know what you moved to exclude.

MS. MOORE: Okay.

THE COURT: And it was totally improper to be quoting those EPA documents in the opening statement, and the whole point was that -- the whole point of Monsanto's argument for why those EPA documents that you moved to exclude should come

in were that they need to tell the whole picture because the plaintiffs are trying to tell a misleading picture about the EPA.

And so now that the plaintiffs have painted part of that picture in their opening statement, it may very well be that they've opened the door to those later EPA documents, and that's something that I will need to consider in addition to sanctioning Ms. Wagstaff for.

MS. MOORE: And, Your Honor, we'll address that in the response then. Thank you.

MR. KILARU: Other than that, Your Honor, I don't know that we need to necessarily back and forth, though I'm obviously happy to do whatever is convenient.

I thought I could just tell you what the other set of objections are in broad brush that we made in case that helps.

THE COURT: Okay.

MR. KILARU: So just in categories. One is the --

THE COURT: You're talking about the Reeves testimony?

MR. KILARU: In Reeves, yes. So one is Knezevich, which we just discussed.

A second is testimony sort of asking for Monsanto's official position on other pieces of science and about the general science around Roundup, which we think is more a Phase II issue than Phase I issue.

A second category -- and just so you have it, there's some

examples of that on pages 29 and 30 and 182, just so you know where the categories are that I'm talking about.

Second would be sort of failure-to-test arguments, that certain tests weren't run. Our position would be that that's at most a Phase II issue without proof of what the studies would show. And there's examples of that at pages 32 to 35, 65, 519 to 22. So, for example, questions about "You didn't run this kind of test," I think our position would be that absent proof of what that test would have showed, that doesn't push the causation inquiry one way or another.

Third, there are a bunch of discussions of internal e-mails among Farmer and Acquavella and Heydens and others about reactions to studies. And I know we talked about the AHS '97 memo but there were also some other *motion in limine* rulings about other internal reactions to studies. So, for example, there was a Farmer e-mail about the McDuffie abstract and whether something was in it or out of it; and there's a lot of e-mails of that nature that I think they're proposing to introduce and try to discuss with Mr. Reeves. So that's just another category of those.

I actually think that's it in terms of broad-brush categories.

THE COURT: Okay. Anything else?

MS. MOORE: I don't think so, Your Honor. We've set forth our position in the transcript and as to why that

information should come in. It's not getting in to -- we went back and removed anything dealing with ghostwriting. Of course, unless they open the door later. But this is about the actual scientific studies, and so that's what we narrowed down Dr. Reeves' testimony.

THE COURT: Okay.

MS. MOORE: Okay.

MR. KILARU: Just one, sorry, Your Honor, last housekeeping matter.

THE COURT: Sure.

MR. KILARU: On the exhibit disclosures, and this might be something that could have helped with this morning, but our understanding is that the exhibits that are to be disclosed are basically anything that's marked with an exhibit in the case. So if something is marked as, say, Exhibit 904 and they intend to use that on an examination, or we do as well and we would comply, that that should be disclosed as opposed to if an exhibit is being shown sort of for pure demonstrative purposes. I don't think that would fall outside the rule.

THE COURT: Yes, that's correct.

MR. KILARU: Okay. Thank you.

MS. MOORE: And, Your Honor, the clarification, the reason that he is raising this is that we reached an agreement last week that demonstratives itself do not need to be on the exhibit list.

When we first did the exhibit list, we --

THE COURT: Disclose to them any documents, demonstratives, or anything that you intend to use.

And, by the way, on that note, I'm going to require both sides to disclose their closing argument slides to me in advance. So you're going to have to get your closing argument slides done in advance because I'm going to review them in advance.

MS. MOORE: Okay. But not to each other; correct?

THE COURT: I mean, part of me wonders if you now should be disclosing to each other, but I'd be fine just reviewing them myself.

MS. MOORE: Okay. Thank you, Your Honor.

And just to clarify, I mean, because here's what kind of happens with demonstratives, as the Court I'm sure is aware, is that those are works in progress; and right now our rule is that we have to exchange exhibits, which we've been doing, 48 hours in advance for a witness. And, you know, typically you're preparing with the expert the day before, and so we would just ask that if it's demonstratives, that we would do that the night before instead of 48 hours in advance.

THE COURT: Any problem with that?

MR. KILARU: I think we're all on the same page. So just to give two examples that are in the courtroom. The charts up here, you know, I think those to me, I don't know

that those would need to be disclosed because they are sort of demonstratives.

I guess my concern is that maybe an exhibit, like, say, I'm just going to use a random number, Exhibit 904, if they're going to use that, whether as a demonstrative or not, I think we should know that that's part of what they're going to be presenting so we have an opportunity to cross-examine and vice versa. That's, I think -- that's the point I was trying to impress.

THE COURT: So you're saying you don't want demonstratives that are not identified as exhibits to be disclosed?

MR. KILARU: I'd probably phrase it the other way, which is if an exhibit -- if something on the exhibit list is going to be used with the witness in any capacity, we think that that should be disclosed.

THE COURT: Yeah. That sounds fine.

MS. MOORE: And what we had done is we were disclosing to them what's on the exhibit list that's going to be entered into evidence. If we were just publishing --

THE COURT: Anything you're going to use.

MS. MOORE: Okay. All right. But we can do the demonstratives the night before instead of 48 hours?

THE COURT: Sure.

MS. MOORE: Okay.

THE COURT: That's fine.

MS. MOORE: Thank you, Your Honor. I appreciate that.

THE COURT: Okay.

MR. KILARU: Thank you.

THE CLERK: Court is adjourned.

MS. MOORE: Your Honor, I apologize. We had a request -- I'm so sorry.

We had a request about bringing in an extra TV screen to show the documents for Dr. Portier's deposition because of the way it was filmed in Australia. We need to have one additional screen. I just want to make sure we had your permission to do that.

THE CLERK: I e-mailed you about this earlier today --

MS. MOORE: I'm sorry. I haven't checked my e-mail. Sorry.

THE CLERK: -- and there was a proposed order.

I e-mailed the whole group that was on there and it was due by 1:00 p.m. today a proposed order so he could review it, and that way they could get it in the building.

MS. MOORE: I apologize, Ms. Melen. Because I had been in court all day --

THE COURT: It doesn't sound like Portier is coming on tomorrow anyway so hopefully you can find the right time to get it done.

THE CLERK: Okay. We'll chat about a bunch of stuff

anyway.

MS. MOORE: Thank you.

(Proceedings adjourned at 3:31 p.m.)

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CERTIFICATE OF REPORTERS

I certify that the foregoing is a correct transcript from the record of proceedings in the above-entitled matter.

DATE: Monday, February 25, 2019

Jo Ann Bryce, CSR No. 3321, RMR, CRR, FCRR
U.S. Court Reporter

Marla F. Knox, RPR, CRR
U.S. Court Reporter